Volume 2
July 1983

Number 2
$2.95

PC

The Independent Guide to IBM Personal Computers



DREAM CONFIGURATIONS FOR FIVE PROFESSIONS

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SHOPPING FOR YOUR IBM

The Darker Side of DOS 2.0

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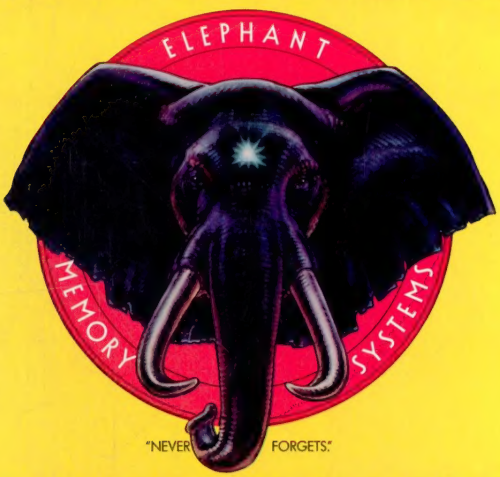
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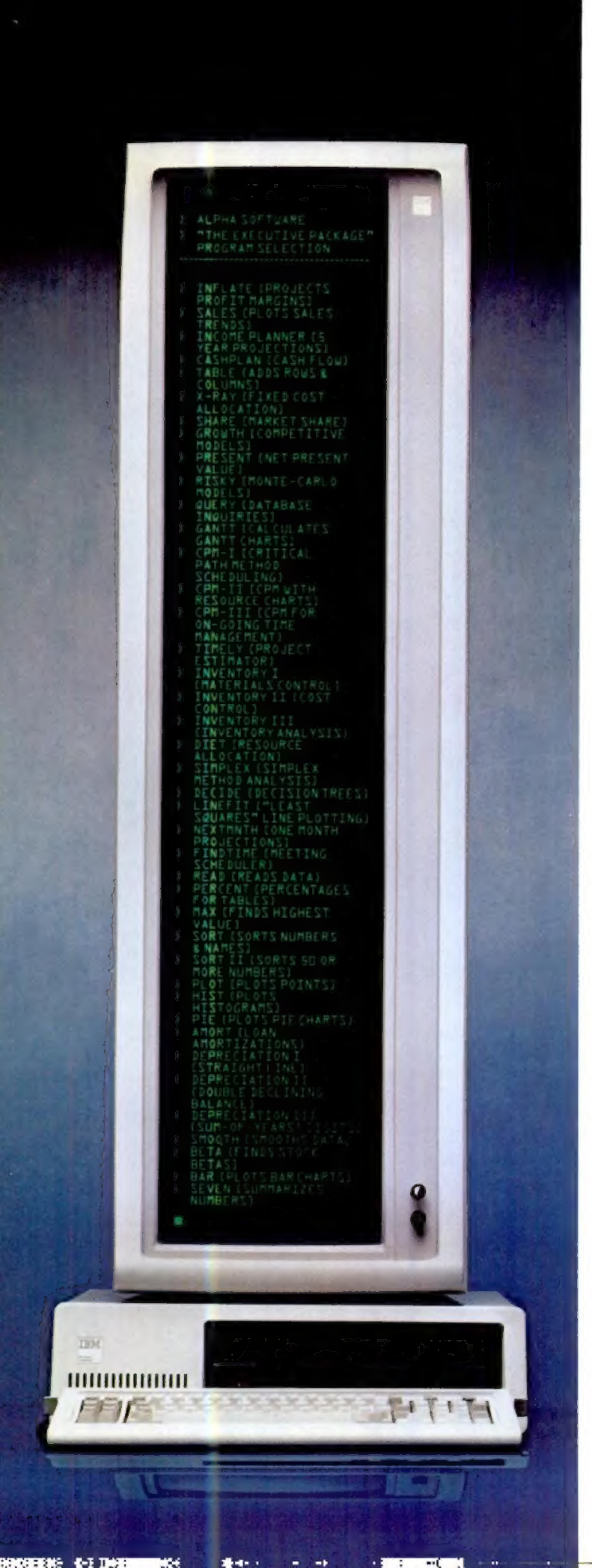
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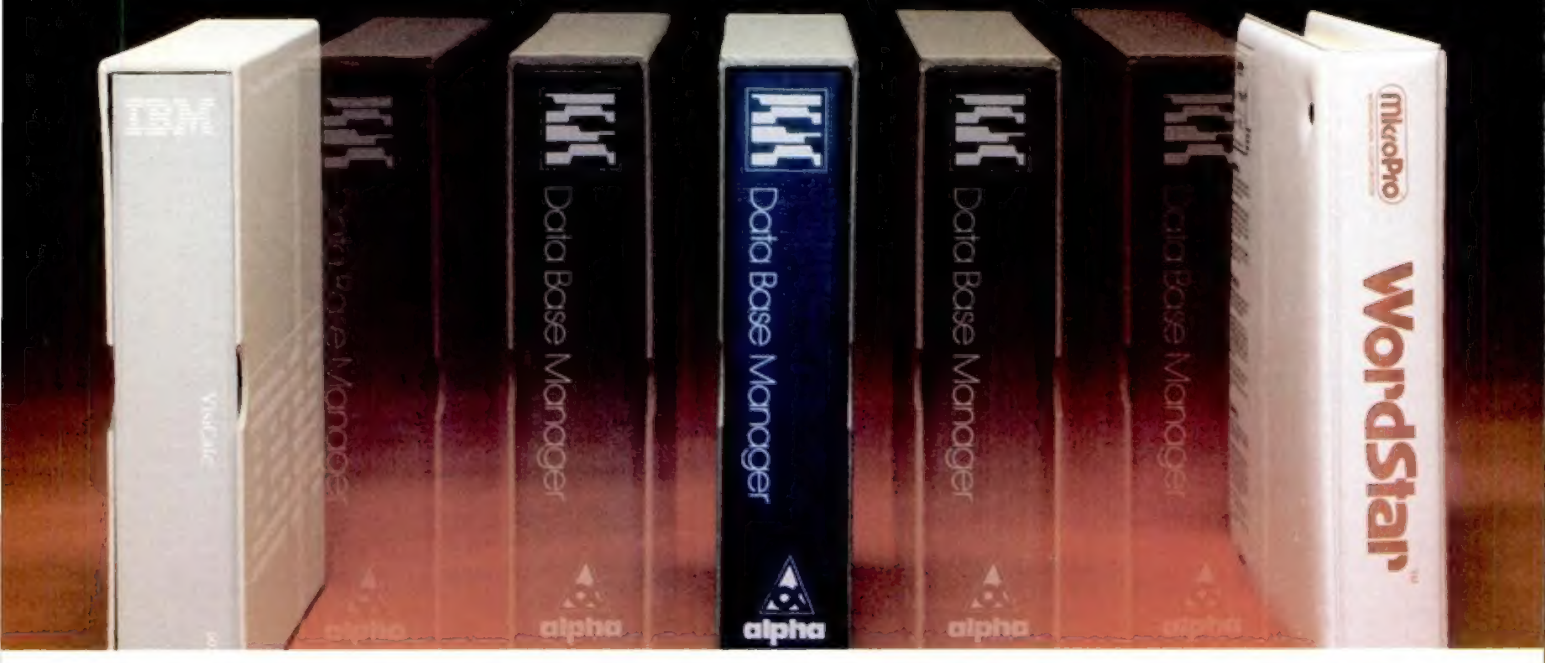
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	A	B
1	FIRST NAME	ROGER
2	LAST NAME	SMITH
3	BALANCE	3261
4	PAST DUE	30
5	CALCULATED INTEREST	
6	AT 1.5%/MO	
7	IS	48 92

Go to **VisiCalc** and Calculate Interest Charges

RECORD NUMBER 7

1	FIRST NAME	:ROGER
2	LAST NAME	:SMITH
3	BALANCE	:3261
4	PAST DUE	:30

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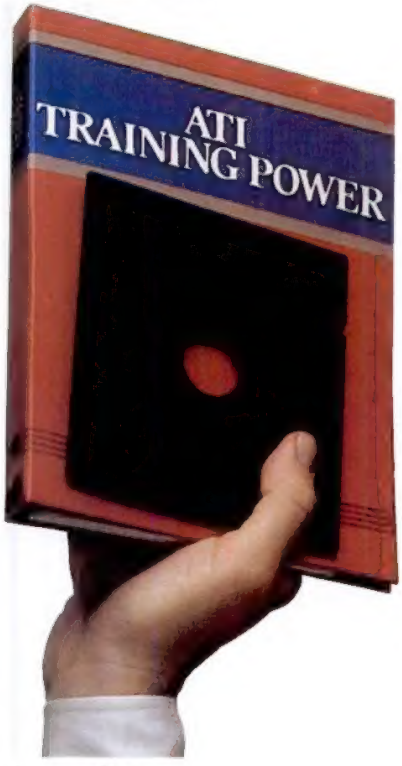
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PC: The Independent Guide to IBM Personal Computers ISSN (#0745-2500) is published monthly for $26.97 one year, $47.97 two years, and $63.97 three years. Additional postage $8.00 for Canada, $20.00 other foreign by PC Communications Corp., a subsidiary of Ziff-Davis Publishing Co., One Park Ave., New York, NY 10016. Second-Class postage paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Send address changes to PC, P.O. Box 789-M, Morristown, NJ 07960.

Editorial and Business Office: One Park Ave., New York, NY 10016. Editorial (212) 725-4694, Advertising (212) 725-7947. For subscription inquiries and service, write to PC Magazine, P.O. Box 445, Boulder, CO 80321.

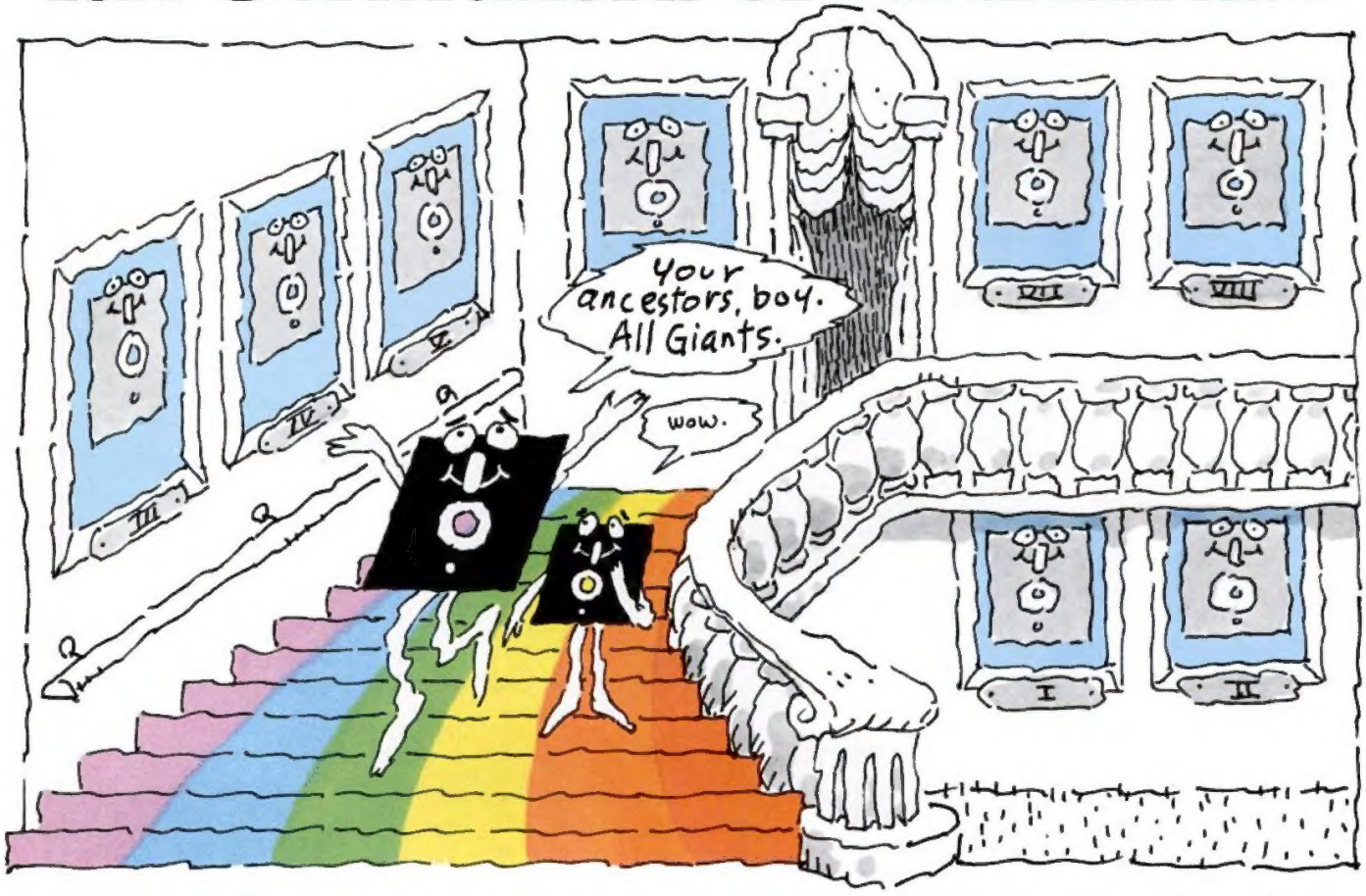
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The Independent Guide to IBM Personal Computers

Volume 2 Number 2
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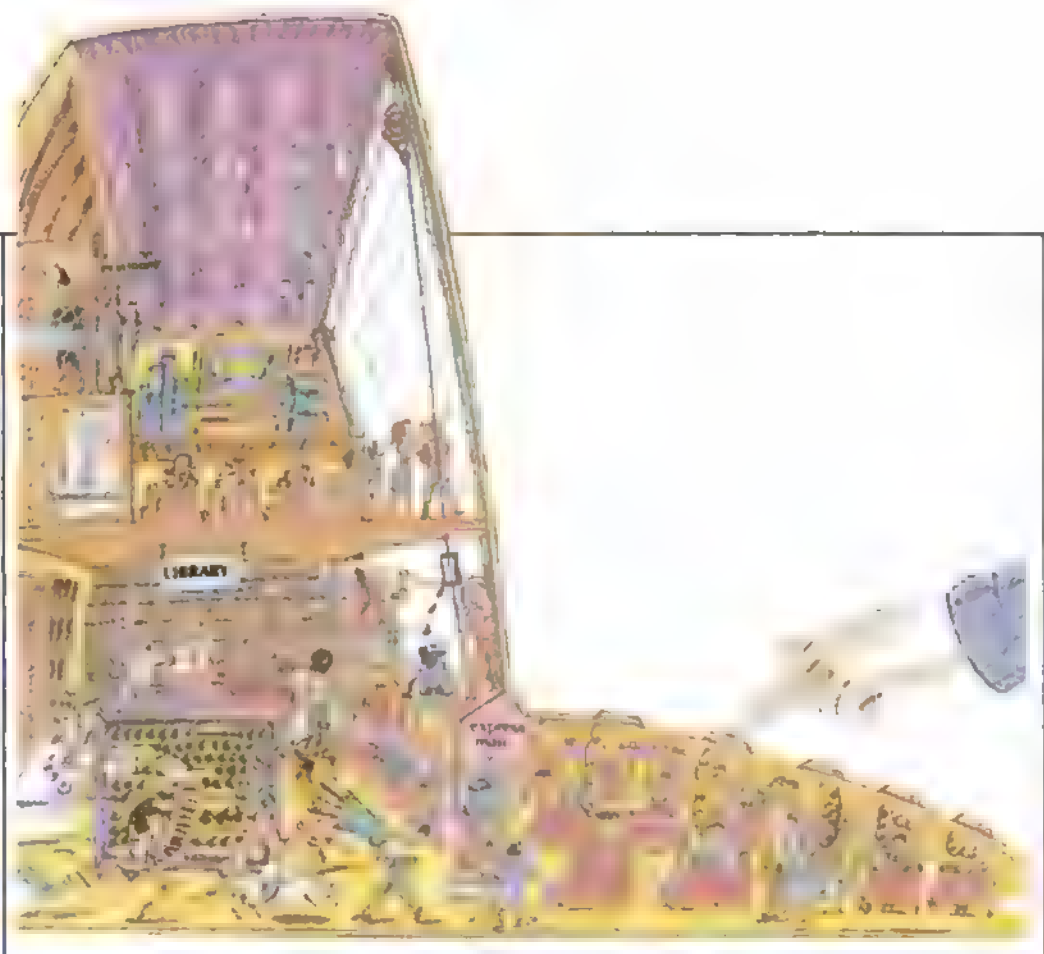
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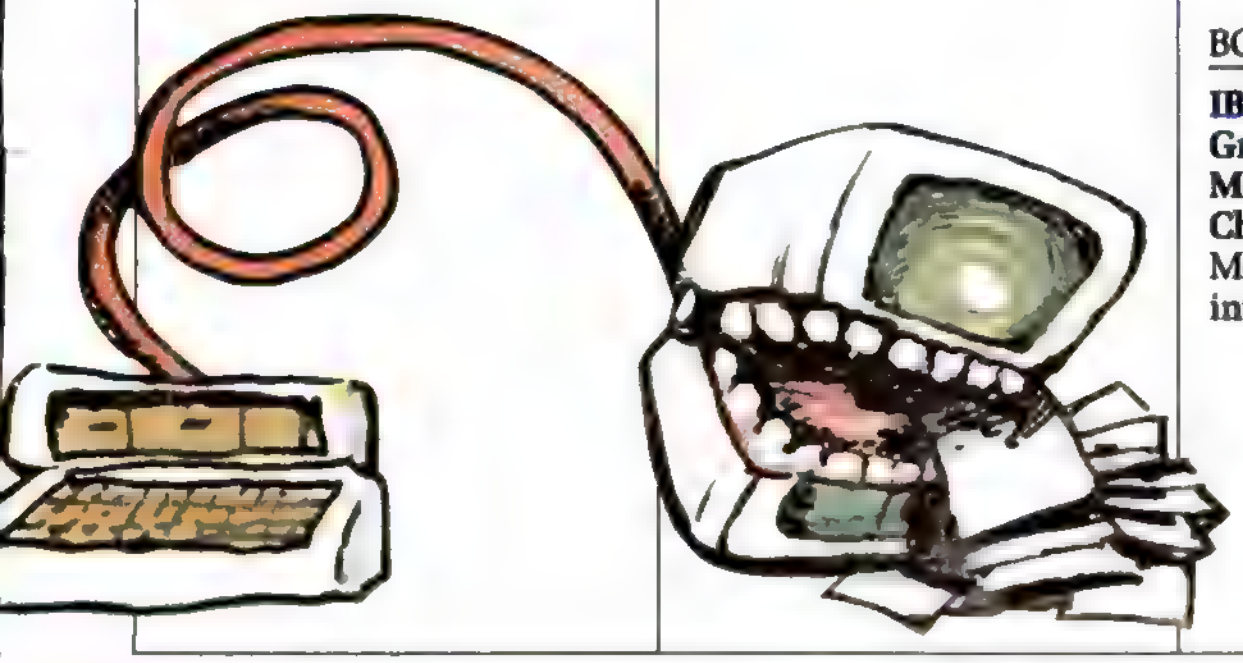
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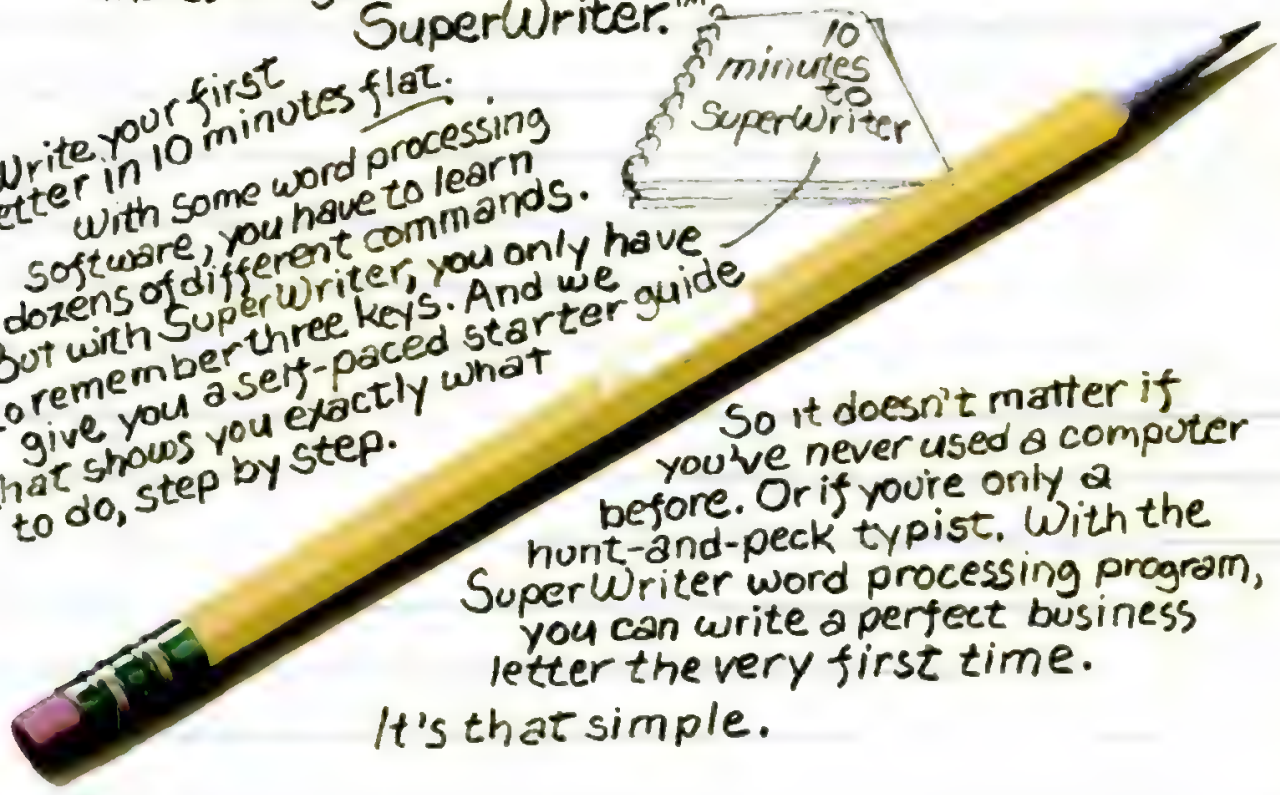
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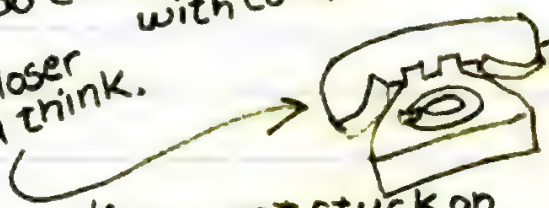
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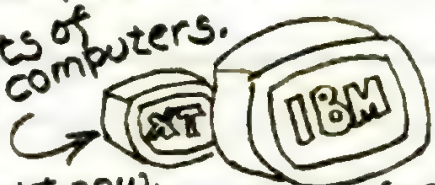
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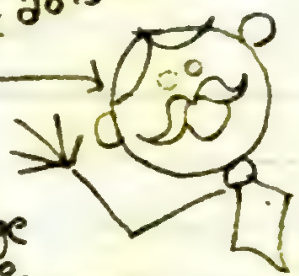
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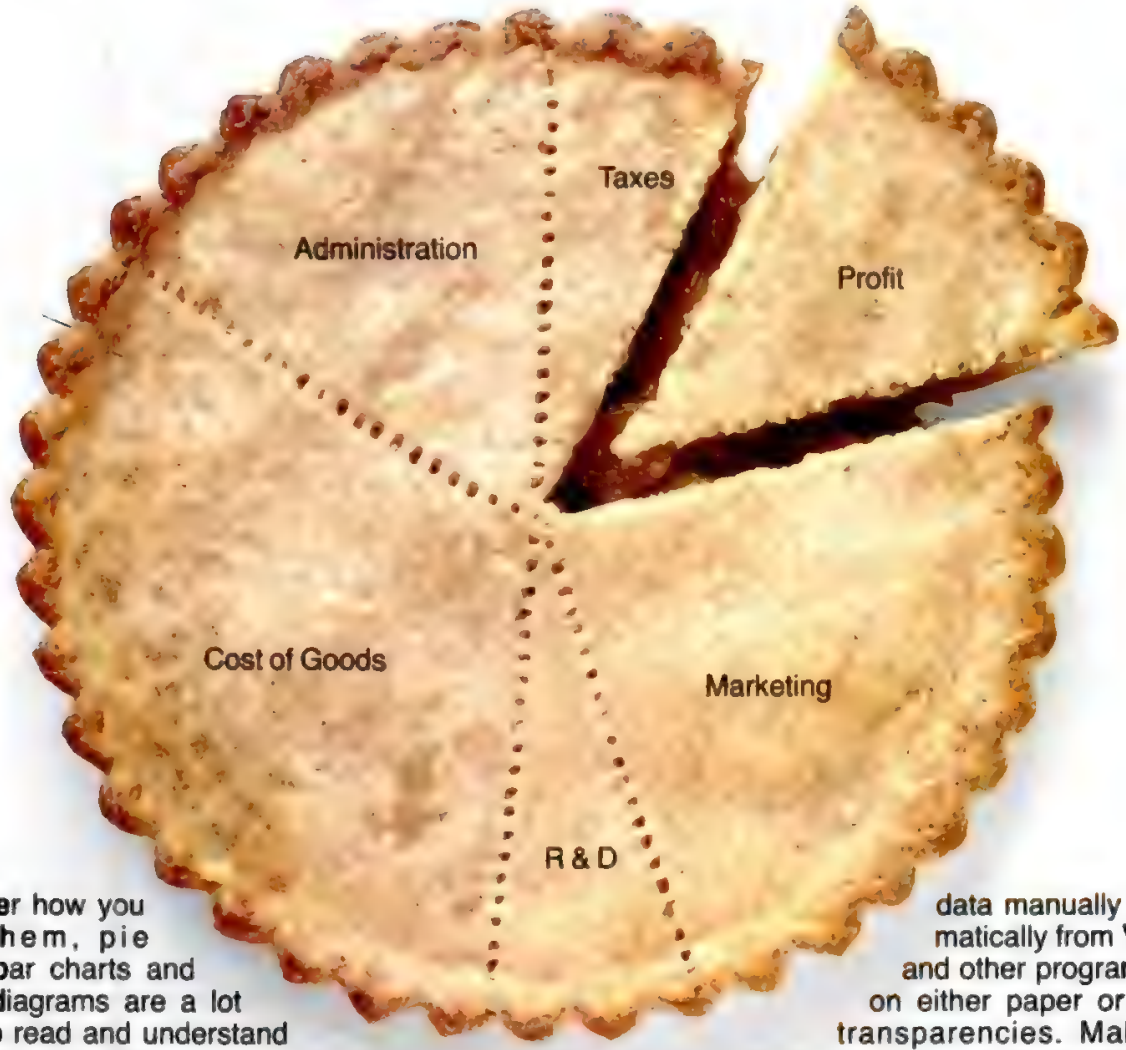
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How you can tell



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So is the other one.

The system on the left incorporates the quality, the reliability and the technological excellence that have made IBM a computer leader for over 30 years.

So does the other one.

So which is which? Simple.

On the left is the IBM Personal Computer, starting with 64KB of user memory (expandable to 640KB) and two optional 5¼" diskette drives. It can easily satisfy your computing needs at the office, at home or in school. With 5 expansion slots, it gives you room to grow. (You can even make it function like the computer shown on the right by adding an expansion unit that houses one or two 10-million-character fixed disk drives.)

This system can run most of the same software and accept most of the same IBM hardware as the computer on the right. And its price/performance is nothing less than remarkable.

The IBM Personal Computer

which is which.



On the right is the IBM Personal Computer XT, starting with 128KB of user memory (expandable to 640KB), a 5¼" 360KB diskette drive *plus* a standard 10-million-character fixed disk drive that's *already* built in.

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And by adding an expansion unit with a *second* 10-megabyte fixed disk drive, you get even more high-volume capacity from the system. XT can run most of the same software and accept most of the same IBM hardware as the computer on the left. And its price/performance is nothing less than remarkable.

But for you to choose, there's a lot left (or right) to learn about both members of this growing family. Visit your authorized IBM Personal Computer dealer. To learn where, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

And see which tool for modern times is right (or left) for you. IBM®

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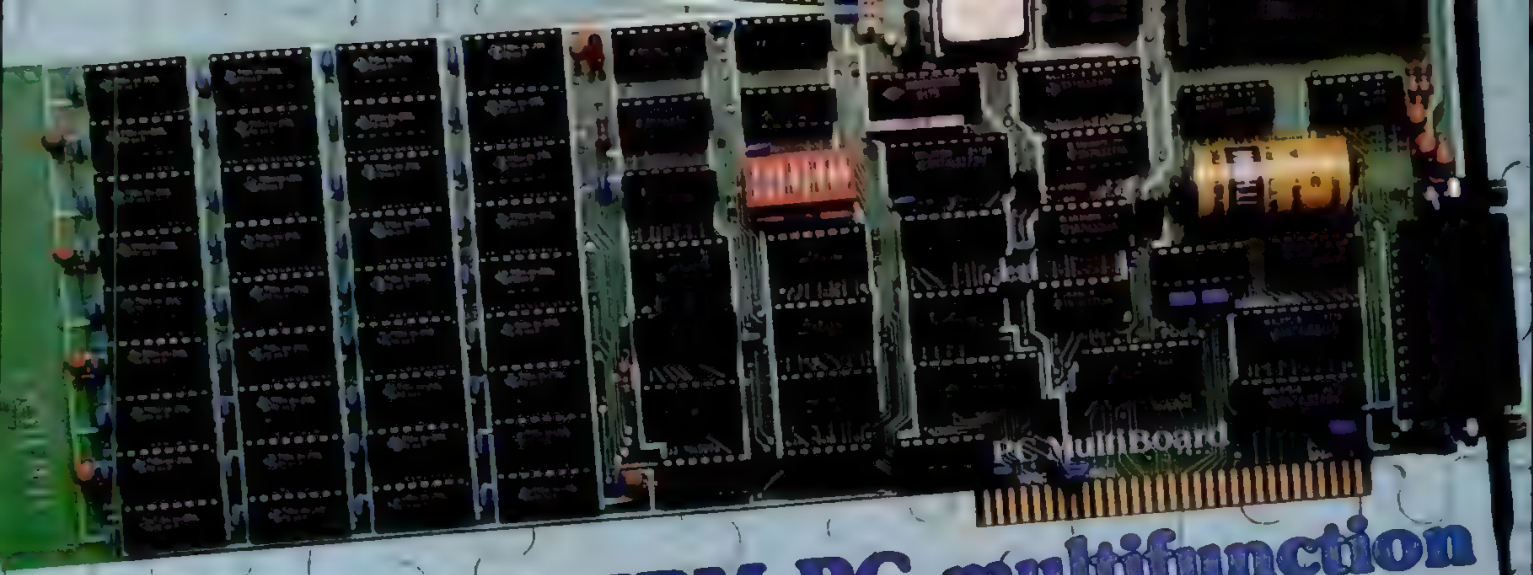
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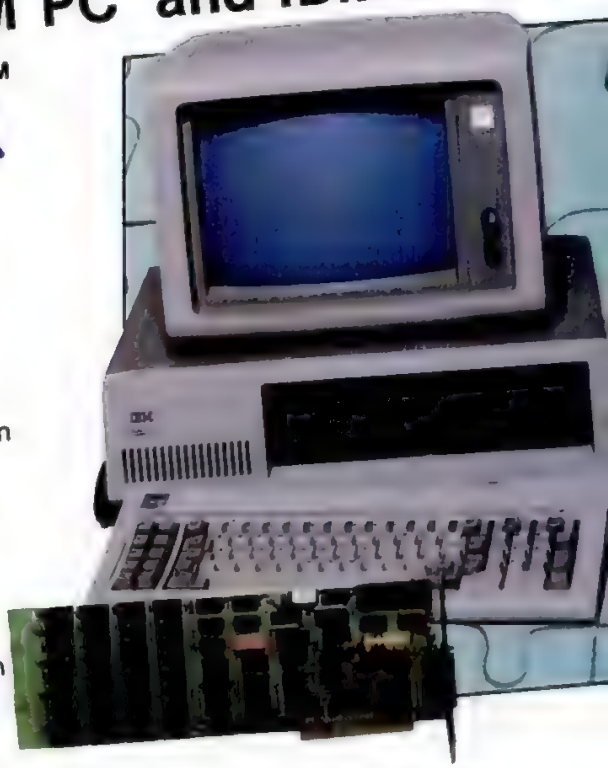


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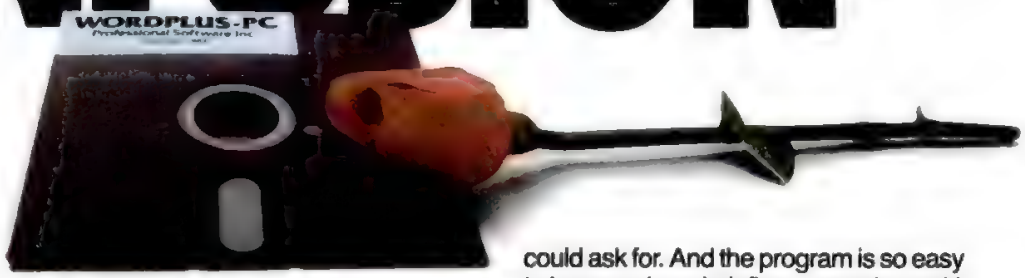
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ANNOUNCING THE END OF WORD PROCESSOR CONFUSION



It's one confusing business, choosing a word processor. All those companies assuring you theirs is the most fantastic one of all. And leaving you to cut through all the smoke and hopefully whittle them down to the best one for you.

Well, we can help. If you'll just invest the next three minutes reading this, we'll tell you about a word processor that makes picking the right one a real breeze.

FIRST, A WARNING. There are two things you must do when evaluating any word processor. First, be careful. It's no secret that many of today's claims about being easy to learn and use just don't stand up to careful comparison. Watch carefully for complicated codes and programs that require "training sessions." Secondly, be selective. Buy a word processor you can use on a daily basis, not one that requires another "training session" when someone goes on vacation. In other words, be very careful to select the word processor that's absolutely the best and easiest to use. Which is what we'll now introduce you to.

WHY ONE WORD PROCESSOR MAKES THE MOST SENSE OF THEM ALL. Meet WordPlus-PC. It's the advanced, "user-oriented" software package that turns your IBM-PC computer into a word processor equipped with the sophisticated capabilities of far larger, more expensive systems.

THE REMARKABLE WORDPLUS-PC STORY. In a nutshell, it's this. WordPlus-PC was designed from the ground up to be the very latest in word processing technology. It has all the important features you could ask for. And the program is so easy to learn and use it defies comparison with other software.

HOW WE CAN BE SO SURE OF OURSELVES. We're Professional Software, a leader in word processing software with over 30,000 customers contentedly churning out letters and documents around the world on personal and business computer systems. We know precisely what a top quality word processor must do. And we've studied all the shortcomings of our competitors. That's how WordPlus-PC came to be the easiest-to-use word processor ever.

ALL THE FEATURES YOU'D EXPECT.



WordPlus-PC is both powerful and versatile. Its long list of major functions includes movement of paragraphs, global search-and-replace, and creation of multiple "boilerplate" and personal letters with the touch of a few buttons. There are 3-line headers and footers and automatic page numbering. When you underline or boldface words as you type, WordPlus-PC displays them in that form on the screen. You can merge information created by popular spread sheet programs. You'll create personal letters quickly and easily, or merge name and address information from other programs. You can easily create standard layouts for preprinted forms and use WordPlus-PC to prepare invoices or quotations. For large corporate customers, WordPlus-PC has the capability to merge information from files created by the firm's mini or mainframe computer. You can even type new documents while the system is printing other ones. And you'll find WordPlus fully compatible with virtually all popular ASCII letter-quality and dot matrix printers.

A BREEZE TO LEARN AND USE.

With WordPlus-PC's easy-to-use documentation, you'll be using your word processor right from the first minute. After an hour, you'll feel at home with all the basic functions and ready to explore the more sophisticated ones. After a few hours you'll put the manual away. There are never any complicated or confusing codes to memorize or look up. Rather, the screen's "message area" reminds you how to do what you want. WordPlus-PC's unique keyboard color coding makes things even easier. And whenever there's a question, simply press the HELP function to get back on track.

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$795. Plotter Has 'Charlie' Back In Pictures.

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So, when you want your IBM PC to become even more modern for the times, plug into the Sweet-P Personal Plotter. Visit your local computer store and see how sweet it is with 'Charlie' back in pictures.



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Buying a computer takes a little more preparation than learning a few key words and putting on the right pair of pants.

A Stranger in MicroLand



I'm a big fan of yellow legal pads. Oh yes, I know of the *Visi, Wonder, Deluxe, Super,* and *Super-duper Calcs*. They're just fine when it comes to figuring out how to equip the new widget assembly line in Ashtabula or how to amortize the purchase of a whirlpool bath for the executive suite. But when it comes to spending *my* money, I get really serious and go to the pads. I fill them with numbers, tables, and charts of advantages and disadvantages. I shuffle them, I order them, I pin them to walls. And then I set out to buy. . . .

Ah, yes, I remember it well. I sat in the parking lot, sweaty hands nervously gripping the steering wheel, my eyes searching the street hoping not to see anyone who might recognize me in my moment of vulnerability. Over and over again, I tried desperately to remember all the arcane words and ideas I had struggled to learn over the course of several months studying *Creative Computing*. (There was no *PC Magazine* back in those dark, dark ages 6 years ago.)

WHAT DID RS-232C stand for? For that matter, what the heck was a modem?

Now, was it the RAM (REM?) that went on the disk and the CP/M that plugged into the ROM? Did I need an asynchronous, a serial, or an RS-232C port for a modem? What did RS-232C stand for? For that matter, what the heck was a modem?

The sun began to set, and with the approaching darkness came a surge of courage. I put down my crib sheets, cinched up my tie, and left the safety of the car. I was headed for my first close encounter with a computer dealer—in this case a pioneering outfit in upstate New York with a cute name like "The Little Byte Shoppe." I was a reporter with a daily newspaper then, doing all of my work on a video terminal tied into a balky mainframe computer. I was fascinated by the idea of microcomputers (the term "personal computer" was not yet born) and I decided to see if I could use one in my free-lance writing.

I mentioned my tie a moment ago because I remember how it seemed very important at the time—first impressions and all that. More importantly, I wanted to make certain the salesman knew that I meant business.

Well, as I reached the entrance to the Little Byte Shoppe, the door suddenly burst open and a horde of kids came flying out. Must have been the Vestal Junior High School chess club on a field trip, I decided. I caught the door and stepped into a scene straight out of "I Was a Teenage Computer Nerd." The average age of the crowd was about 16, if you left out the grade school wunderkind with a soldering

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iron, perched on a stool at the repair bench.

My tie won me no favors. I finally identified a sales clerk: He was the 17-year-old playing chess by flicking the front panel switches of an Altair. The process required a double swap from chessboard notation (Pawn to King's Bishop 4) translated to hexadecimal code. It made me dizzy to watch, but even my vertigo failed to win me any notice. The adolescent chess whiz never acknowledged my presence; why bother attempting to sell something frivolous like a microcomputer to a businessman in a suit?

I finally interrupted him to ask a pithy question like, "Which machine do you think I should buy for word processing at home?" He flicked two more switches, grunted in appreciation at the Altair's prescient castling move, and then proceeded to give me his professional opinion. I was lost somewhere between the first bit-register and the second RAM-refresh nanosecond of his reply. I mumbled my thanks and retreated to half an hour of wandering around to the various plays stations. Finally, I backed my way out of the store, never to return.

Four years later, I found myself working in an office full of sophisticated desktop microcomputers. I was writing speeches, reports, and press releases with all of the ease offered by a personal word processor. But I was going home at night to write novels and magazine pieces on a tinny portable typewriter. I decided the time had come for another pass at a computer store.

THE DOOR suddenly burst open and a horde of kids came flying out.

The retail market had changed considerably. The phone book now listed various Computer "Lands" and "Worlds" and "Business Centers." There was not a Shoppe in sight. I refreshed my lexicon of computerese and headed for one of the franchises. Considerably more assured of my self-image, and perhaps with a dim

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Writing, editing and printing your thoughts are done in a single process that's fast—without waiting for typing and retyping. And your results may be even more professional-looking because what you see on your screen is exactly what you get in your final printed result.

Easy to learn.

You're ready to write the instant the program is loaded. A simple, uncluttered screen display presents a multiple choice "menu" of functions.

You simply choose which function you want to use and the on-screen prompts tells you how to use it every step of the way.

A QuickStart™ course is included to get you or anyone on your staff producing letters and reports within 30 minutes.

Even easier to use.

There are no hard-to-use "control" characters. A single keystroke selects all primary program functions—Insert, Delete, Copy, Move, Find/Replace, Storage and Print.

The most-used editing functions are also easy-to-use, because they're done with a single Function Key. These include Center Line, Underline, Delete, Delete To End Of Line, Undelete, Indent, New Page, Decimal Tab and Again.

Dynamic full page formatting lets you see instantaneously on the screen exactly what you'll get on paper. "Word wrap" is automatic for both creating and editing documents.

Additionally, time-saving "help" screens, and a clear, concise User's Guide in plain English give you the assistance you need at a glance.

More powerful editing with much less effort.

The VisiWord program lets you move, copy, or delete columns of information as well as paragraphs, and even pages, simply and easily.

It helps you make your documents look more professional by automatically formatting and numbering each page, and adding headers and footers if you wish.

And the VisiWord program's split screen windowing function lets you see two documents at once, and take parts of one and incorporate them into the other.

You can even change your mind about a change—the "undelete" feature recalls lines of text you've deleted.

Edit one document while you print another.

The "print spooling" feature of the VisiWord program will save you important time by letting you print out one letter-perfect document at the same time you're creating another on your screen.

VisiWord becomes even more powerful with other VisiSeries™ programs.

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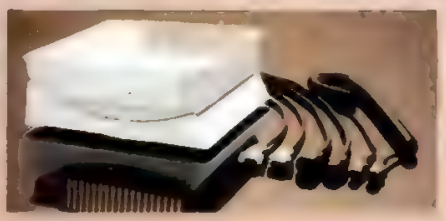
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A lot of quality products from companies like Visicorp, Ashton-Tate, IUS, Hayes, and Corona Data Systems have made life for the IBM PC user a whole lot easier. And more productive.

Add Curtis to that list.

Because now, thanks to our PC Pedestal™, you can "tilt and swivel" your IBM display, instead of your body. No more bobbing and weaving to avoid glare. No more neck and eye strain. That means you'll pay a lot more attention to what you're doing, then to how uncomfortable you're feeling.



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So next time you sit down at your IBM PC, make yourself a little more comfortable.

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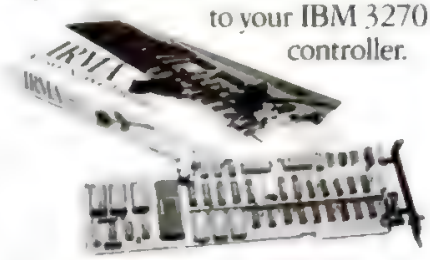
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recollection of my previous excursion into MicroLand, I was dressed in a faded pair of jeans and an old sweater—my essential writing clothes.

I WAS LOST somewhere between the first bit-register and the second RAM-refresh nanosecond.

The store fairly gleamed of glass and chrome. Displayed around the room, like so many high tech *objets d'art*, were the considerably more finished microcomputer products of the 1980s: IBMs and Apple IIs and Osbornes and the like. I worked my way from front to back playing idly with each of the machines for nearly an hour, completely unmolested by the two salesmen who were engaged in a fierce battle of *Space Invaders*. I was finally approached by a young woman who was in charge of the cash register. I told her I was looking for a computer for the home. Without asking me a single question, she directed me toward the Atari video game display. It must have been the blue jeans.

I finally did buy a microcomputer—an IBM PC, by the way—and with help from some knowledgeable and honest salespeople at retail stores and mail order operations. But it was a long, long process, and closer to the search for a used car than to the purchase of a household appliance.

I learned that you can go home again, without a computer.

The marketplace has continued to change, and you should be able to find someone to sell you a computer no matter what the uniform of the day, perhaps with a little help from *PC Magazine*.

In this issue, we take a tour of the state of computer retailing today. *PC Magazine* bankrolls a "computer virgin" on a shopping trip. We venture to the end of the telephone line at a mail order house. We sell PCs for a day. We cast some light on the Gray Market. We explain the economics of leasing and renting. We read you your rights as a consumer. It's all part of trying to keep the customer satisfied.

—*Corey Sandler.*

If you guessed that a Practical Peripherals Microbuffer™ printer buffer saves time, you're right. For the way it works, this inexpensive product is the most practical addition to your microcomputer system ever.

With Microbuffer, you don't have to wait for your printer to finish before you resume using your computer. Data is received and stored at fast speeds, then released from Microbuffer's memory to your printer. This is called buffering. The more you print, the more productive it makes your workflow.

Depending on the version of Microbuffer, these buffering capacities range from a useful 8K of random access memory — big enough for 8,000 characters of storage — up to a very large 256K— enough for 256,000 characters of storage.

Practical Peripherals makes stand-alone Microbuffers for any computer and printer combination, including add-on units especially for Apple II computer and/or Epson printers. Each has different features like graphics dumps and text formatting besides its buffering capabilities. You can choose one that's just right for your system.

Best of all, they're built to last and work exactly like they're supposed to.

If you're still guessing whether you can afford to have one, talk with any computer dealer. That's the best way to find out how practical a Practical Peripherals Microbuffer is.

PRACTICAL PERIPHERALS

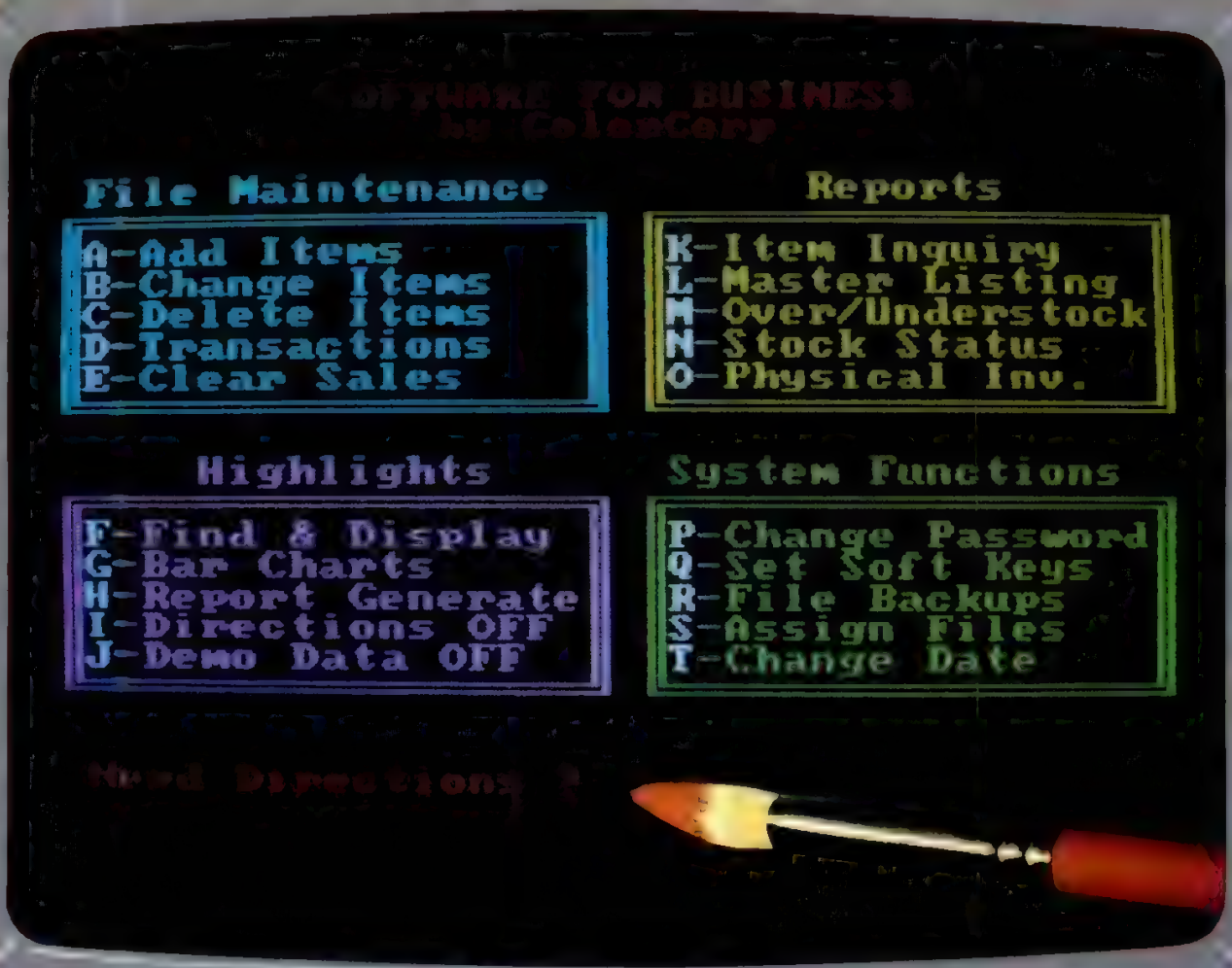
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CIRCLE 370 ON READER SERVICE CARD

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CIRCLE 163 ON READER SERVICE CARD

Letters To PC

Room For Expansion

With the introduction of the PC-XT and the rampant rumors about the PC II, I have but one wish. I do hope that IBM will provide a way to update the old IBM PCs to perform some of the new features.

I would very much like to be able to use the 64K chips on my motherboard, rather than the 16K that my PC has, not to mention the three extra slots in the back. One would think that Big Blue would foresee the possibilities for expanding and improving the original PC, and would provide a reasonably priced modification to update them. I guess we will now see just how consumer-oriented IBM is.

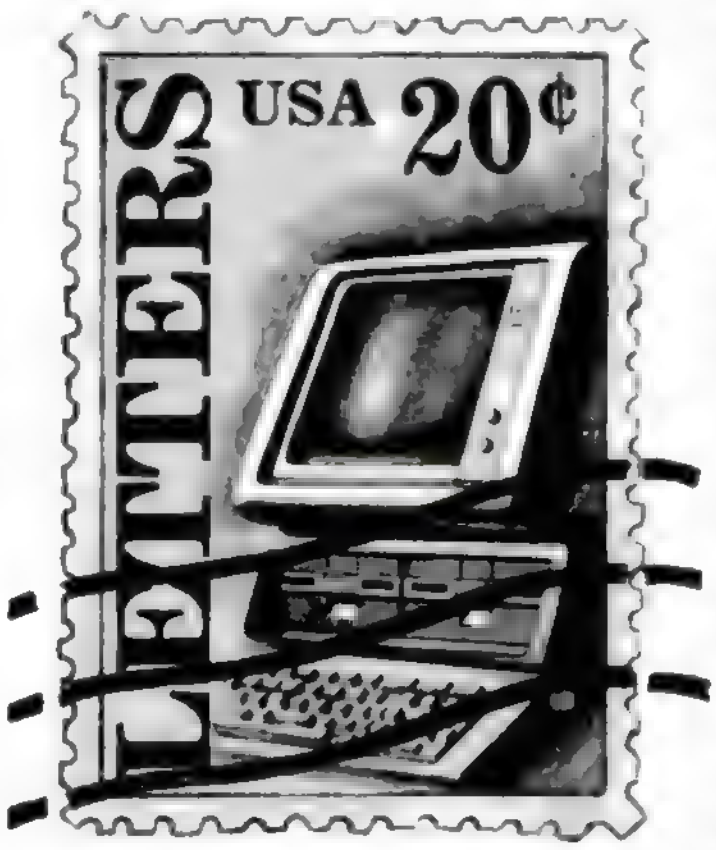
Gary B. Kendrick
Chatanooga, Tennessee

Sorry, Gary, you're out of luck. If your PC happens to be under contract with IBM and something catastrophic happens to your motherboard, Big Blue just may replace it with one of the newer models that can handle the beefier chips. Some manufacturers are planning to bring out kludges that they claim will let you insert 64K chips into the older sockets, but we haven't yet tested any of them. The computer market is moving so rapidly these days that these kinds of changes are commonplace—the unofficial motto of this industry is, "If it works, it's obsolete."—Ed.

The Melody Lingers On

In my article "A Musical 'Invention' " (*PC*, Volume 1 Number 12), I inadvertently left out a period in the listing of the music lines. In Figure 1 on page 421, the melody line should have ended with a period after the A1 (A1.), giving the A note six beats instead of four. Likewise, the harmony line should end with a period (F1.). This would result in the intended three beats to a measure, traditional for a waltz.

In addition, on page 419 in the paragraph beginning "A dot . . ., " the second sentence should read, "For instance, G1. will play G for the length of a whole note and a half note run together." The dot after GI makes a difference of two



beats.

I've already gotten feedback on the article from a Seattle-area high school trumpet player, who has a PC and is using the article as a basis for writing three-part harmony for extra credit at school.

Bunny Hammersla
Edmonds, Washington

What's Up, .DOC?

Regarding "The Simplicity of Qwerty" (*PC*, Volume 1 Number 12), I would like to thank Tom McLaren for the comprehensive review and to provide additional information.

The current version of *Qwerty* runs under PC DOS 2.0 (with 96K) as well as with DOS 1.1 (with 64K); a monochrome display is now just recommended (instead of required); and *Qwerty* now also runs on the PC-XT, Compaq, Columbia, Hyperion, and other PC-compatible computers.

Qwerty can be used to edit ASCII files with *any* extension. When an extension is not specified, .DOC is implied, and the default margins and tab stops are typical for a letter. When an extension is specified, the default margins and tab stops are typical for a program. The restriction to .DOC files applies when "LIST document names" is selected from the menu. In this case, only file names with .DOC extensions are listed.

Hank Krejci
HFK Software
Danbury, New Hampshire

Thank-you Note

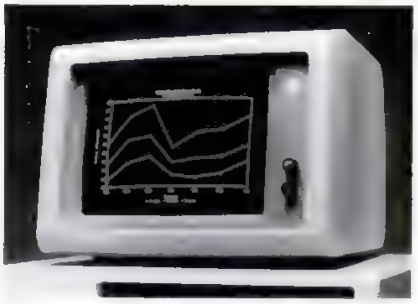
As chief programmer and sweeper here at Once Begun Computations, I would like to thank Corey Sandler for his review of our *Kaleida* program ("PC Arcade," *PC*, Volume 1 Number 11). *Kaleida* went through 45 major evolutions before we judged it to be finished and worthy of our guarantee. Sandler's appreciative comments helped make the long and oftimes bleary-eyed hours worthwhile.

M. Gary Cohen
Once Begun Computations
Searsport, Maine

An International Date Line

I have a few comments to make concerning Paul Somerson's article, "Tie Me IBM Down, Boys" (*PC*, Volume 1 Number 11).

Yes, Australians probably have less "discretionary income" than Americans, but perhaps they also have more discretion. Most of Australia has an ideal climate; perhaps this is why Australians are more likely to buy sailboats and surf



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But naturally the Hercules Graphics Card does a lot more than just make a great program like 1-2-3 better. It gives you high resolution bit mapped graphics on the monochrome display—something the IBM monochrome card simply can't do.

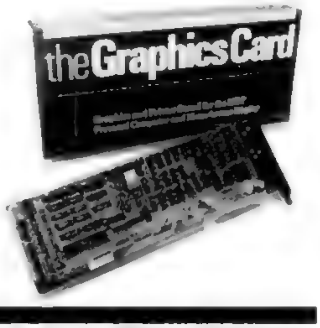
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CIRCLE 261 ON READER SERVICE CARD

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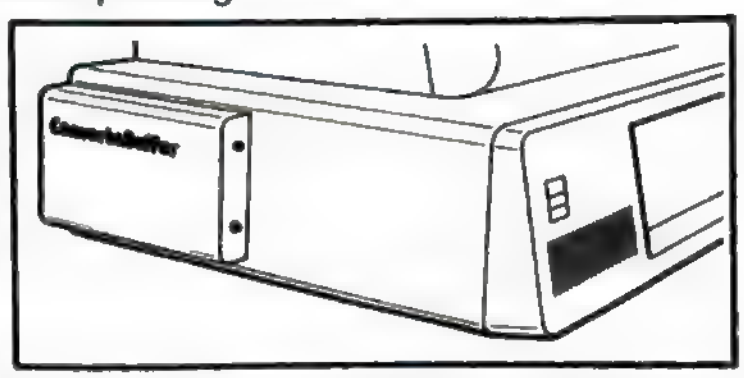
Now we give you graphics

ConvertaBuffer™

IT'S A CONVERTER. There was a time when buying a letter quality printer meant giving up graphics. Now, however, ConvertaBuffer™ gives you the best of both worlds by allowing you to print the business graphs generated by programs such as MBA and 1-2-3 on letter quality printers such as Diablo and NEC. And, the quality of these graphs are as good as those drawn by dot matrix printers such as the IBM/Epson. ConvertaBuffer translates the Epson-format graphics data output from MBA, 1-2-3, and other packages with graphics capability into the format necessary for printing on a letter quality printer.

IT'S A BUFFER. Generating graphics requires the outputting of a large amount of data to the printer. ConvertaBuffer speeds this process by receiving the data as fast as your PC can send it — 1,000 characters per second; storing up to 64K bytes of data in its built-in memory buffer; and then sending it to the printer at the printer's slower speed — 25 to 55 characters per second. This allows you to go on to other work without having to wait for the printer to finish printing.

EASY TO INSTALL. ConvertaBuffer comes with its own built-in cables which plug directly into your PC's printer adaptor and your printer's cable without removing the cover of the system unit — there is no need to buy an extra cable. And, each unit has its own fully regulated DC power supply — the unit does not steal power from the PC or the printer.



ConvertaBuffer also features a convenient front panel switch which resets the buffer to abort the printer output if desired. And, the status light indicates when ConvertaBuffer automatically switches to the graphics mode.

HAVE YOUR CAKE AND EAT IT TOO! The parallel-to-parallel ConvertaBuffer for graphics is the latest member of the ConvertaBuffer family. The original ConvertaBuffer enables you to connect any RS-232C serial interface equipped printer directly into the parallel printer port of your PC with up to 32K bytes of printer buffering.

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von Leivendyke

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Letters To PC

boards than computers.

I am very pleased to find that programmes using British spelling are, or will be, available. I hope they will be marketed everywhere, for what Americans fail to realise is that of all English-speaking countries, only the United States has its own spelling system, and only Americans write dates month/day/year. This is often overlooked.

As we admit that the IBM Keyboard can be, and has been, improved, I hope we can agree that the American system is totally illogical. There are two other ways of writing the date numerically: Australians, in addition to New Zealanders, Canadians, and the British, write the date in a logical progression from shortest time period, the day, to longest, the year. As Somerson mentioned, this creates some confusion in the U.S.

Now let me introduce you to the European alternative, which is also being used more frequently in Canada: year-month-day. The advantages are many, the drawbacks none. There can be no confusion when the date is written in this manner; I have never had a cheque returned (and I have had both American and Canadian bank accounts). Just think how much easier it would be to scan through the DIR files looking first for the correct year, then the month, and finally the day. Those of us who use computers must appreciate the logic of that. I hope to find a way to change PC-DOS 1.1 so that it will list dates as I want them.

Thanks very much for expanding the horizons of PC *Magazine*. I look forward to articles about countries in addition to Australia and France.

James Micklewright
Vancouver, British Columbia, Canada

Thank you for your comments on British English and various ways to construct dates. You will perhaps forgive us our orthographicentricity when we tell you that we prefer the British spellings for that variously-shaded color between black and white—although our style insists on gray with an a. Also, it's much more glamorous to spell glamor with a u: glamour, don't you think? In any case, we've expanded our horizons as far as Japan in this issue. See "Over There: IBM in Japan;" we think you'll enjoy it.—Ed.

Save That File!

I read with interest Mark Zachmann's "PC Tutor" column in *PC*, Volume 1 Number 11, and thought that I might be able to offer some more information on the subjects of erased files and hidden files.

PC-DOS does not provide any easy or regular means either to recover hidden files or to control the file attributes, such as "hidden," "system," and "read-only." However, there are programs available to do all these things. My Norton Utilities package includes tools that make this quite easy, and similar programs are also available from other authors.

Many people do not understand how it could be possible to recover an erased file, but a little analogy can help make it clear. Erasing a file from a disk is similar to taking a file folder out of a filing cabinet, and throwing the pages from the folder into a waste basket. The data from the file hasn't been destroyed, it simply has been discarded. Eventually the data on the disk will be completely lost, when other data is written onto the disk sectors where the old data was.

An erased disk file can be recovered by a process that is analogous to digging through a waste basket, looking for something you threw away. Provided that the original data is still in the disk's "waste basket," it can be recovered. A program like *UnErase*, which is part of the Norton Utilities package, can do the tricky technical task of re-allocating data to an erased file. If the file recovery program is well-written, the process can be very easy.

Anyone who uses an IBM PC would be wise to get a good set of file recovery programs, and not just to get back files that were accidentally erased. Good file recovery programs can help you get back data that was lost due to damage to a diskette, or due to scrambling of a disk's file storage tables. Using your PC without file recovery programs is like driving a car without insurance, or swinging on a trapeze without a safety net.

Peter Norton
The Norton Utilities
Santa Monica, California

The Correct Time Is . . .

I recently submitted the *TellTime* program by Lloyd Onyett ("Learning to Tell Time With TellTime," PC, Volume 1 Number 11) to my IBM PC, but it did not run properly. I deduced that either my PC is not running right, I keyed the program in incorrectly, or there is a typo in the printed program.

I have checked my input and can find no typing mistakes. Is the program correct as it is printed? If so, then I must assume that my PC is on the way to the repair shop.

Charles L. Mudd
Woodbridge, Virginia

You can call off the repairman. In adding some features to the original program, we inadvertently introduced two errors. Lines 750 and 820 are incorrect. They should read:

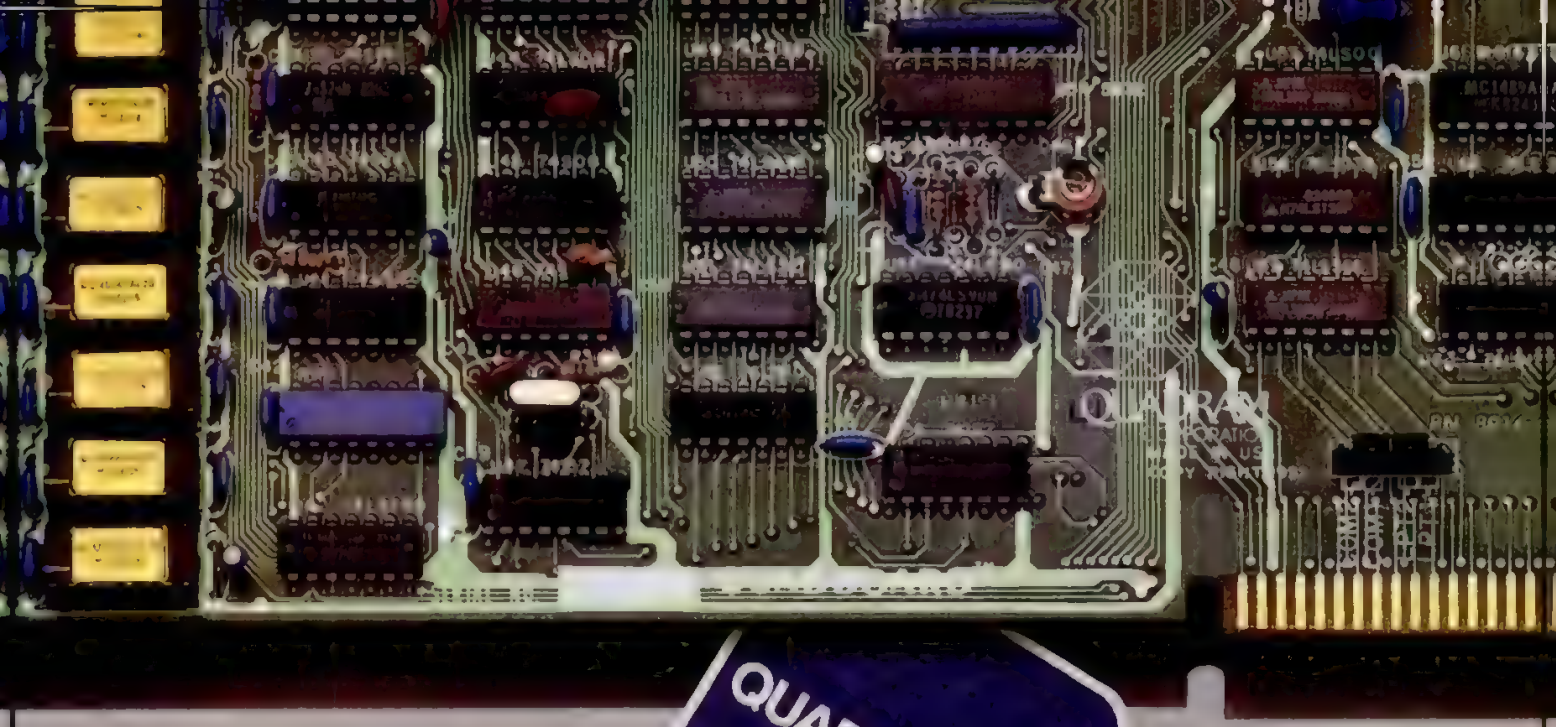
```
750 GOSUB 1270
820 IF ANS = 24 THEN 1390
```

—Ed.

A BASIC Error

I just received my first issue of PC (Volume 1 Number 11) and found the information contained within to be far beyond my expectations. Thanks for a good magazine.

In the article "Back to BASIC," there is a problem with the memory test pro-



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Plus there's plenty of memory space available. Quadboard is expandable in 64K increments to give you up to 256K of RAM. The memory rows are fully socketed. With parity and checking standard.

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Quadboard comes with a complete software package. The QuadMaster disk. With programs that let you use part of memory as multiple solid-state RAM Drives. Super-fast drives that let you store information for easy access.

Plus there's Qspool. The program that lets you turn your memory into a print buffer. Choose from 8K to 56K of buffer space. And compute while you print. No more waiting.

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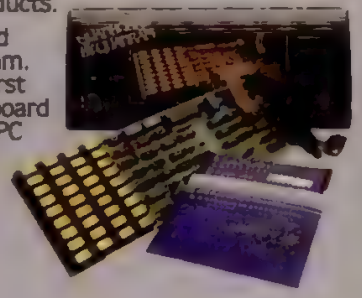
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CIRCLE 477 ON READER SERVICE CARD



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Letters To PC

gram on page 548. After running the program, I got a BAD and a BEEP for all 8300 A variables. I carefully rechecked my input and it was correct.

The problem seems to be in line 30, which reads as follows:

```
IF A(Y) - A(Y) <>1 THEN PRINT
"BAD": BEEP
```

I changed the 1 to a 0, and everything works fine.

Stephen Terrell
Lexington, Kentucky

According to our technical editor, Bill Machrone, you're absolutely right. Thanks for the tip.—Ed.

Too BASIC

I am a subscriber to PC and I think it is perfect, with one exception. You publish articles for beginners in BASIC, but only occasionally for people who are relatively familiar with BASIC. "Back to BASIC" (PC, Volume 1 Number 11) provided great information on POKING to simulate hitting the Caps Lock key. How about giving us non-novices a demonstration program on how to Call a machine language program from BASIC and return?

Brad Cottingham
Philadelphia, Pennsylvania

PC Magazine will be giving ever-increasing attention to the growing number of people developing their own programs on the IBM PC.—Ed.

A View From The Cockpit

As a commercial and instrument pilot, I agree completely with Trevor Thomas's critique of Will Fastie's review of Microsoft's *Flight Simulator* (Letters to PC, Volume 1 Number 11).

I happen to be one of those who, after reading Fastie's review, purchased the program. Apparently Fastie spends little time behind aircraft controls or he wouldn't have been so enthralled by the program. *Flight Simulator* is definitely interesting and excellently written. But amazing? Hardly!

Microsoft claims in its advertising that the program "features a full-color, out-the-window flight display." What Microsoft doesn't say is that you must have a composite color monitor or connect your PC to your television set to get the full color.

How many PCs have you seen hooked to home television sets, Microsoft?

Gary Hopps
Lowville, New York

Truly Dedicated

As an experienced and dedicated word processing operator, I do not agree with the philosophy of microcomputer users concerning word processing. As a general rule of thumb for an office environment, if more than 25 percent of machine time is to be devoted to word processing, a dedicated word processor would be better suited for that office than a microcomputer.

Dedicated word processing systems offer many more functions and features, and have better hardware and software support. Though the cost may seem higher, in the long run a dedicated word processor is more attractive.

If computing capability is needed, most of the dedicated word processors offer operating systems that allow them to be programmed and to run data processing software.

Max Trejo
Albuquerque, New Mexico

In Defense of Volkswriter

The day PC, Volume 1 Number 12 arrived was a good day for reading. My computer was tied up printing 30 copies of a document for a mailing. You can imagine my surprise when I read Edward Madory's letter to the editor complaining that *Volkswriter* would not print more than one copy of a document at a time. At that moment, my copy of *Volkswriter* was doing what Madory said it could not do. I've had no problem printing with either the 64K or 128K version of release 1.2.

The mechanism for printing multiple copies is not as obvious as it is on some other word processors, but the manual is clear on how to get it working. Madory's problem may be in his copy of the software rather than in Lifetree's suggestions.

In general my experience with *Volkswriter* has been very good. I would hate to see your readers spend a lot more money than they need to because of Madory's isolated experience.

Robert Thompson
Armstrong, Pennsylvania

Screen Gems

I am thankful for some of the photographs of different software programs in other computer magazines. *Creative Computing*, for example, prints many such photos, but they don't specialize in the PC. That's why I think you should run photographs of what software looks like on the screen.

The pictures you do run are appreciated. Tell your artists they are doing an A+ job, along with the writers.

Scott Hysom
Mercer Island, Washington

We've been looking for a camera that produces really excellent screen photos—merely good is not acceptable to us. You will be happy to note the appearance of several screen photos in this issue. There are many more to come, and, in addition, an article about these cameras will appear in an upcoming issue.—Ed.

Printing With Prowriter

Some time ago I wrote to PC about the fact that I could not get my Prowriter to print when I used the PrtSc Key. After 3 months, Leading Edge finally answered my letter, and told me which switch set-

Letters To PC

tings to use. Perhaps you'd like to tell your readers.

If you have a Prowriter, the switch settings you should use with your PC are: switch 1-2, 6, and 7 closed; switch 2-7 closed.

Michael Trombetta
Manhasset, New York

Feeling Left Out

We are one of the leading manufacturers of "spike" and "noise" suppressors in the country and have been for over 14 years. Yet when your writer Winn L. Rosch did a cover story on the field, "Block That Bolt, Hey" (PC, Volume 1 Number 11), we weren't even mentioned on your list of available source manufacturers.

We manufacture Spike-Spiker, a line of unique transient voltage surge suppressors and AC power line noise filters, which are all available as power consoles and plug-in units.

Charles F. Kerchner, Jr.
President, Kalglo Electronics Co., Inc.
Bethlehem, Pennsylvania

We've had a large response to the series of articles on maintenance and power problems in Volume 1 Number 11, especially from manufacturers offering new and relevant products. Clearly, this field has grown very quickly, and even Winn Rosch's exhaustive treatment could not mention every available product.—Ed.

Power Line

As a manufacturer of power conditioning and monitoring equipment, I was very interested in PC, Volume 1 Number 11. Winn Rosch is to be congratulated on his uncomplicated presentation of these mysterious and elusive power problems.

A few months ago, RKS Industries established a "Power Hotline," offering toll-free consultation on power requirements and problems. The number for this service, which continues to be very popular, is (800) 892-1342. In California, call (408) 438-5760.

Thanks for passing this information along to your readers.

Richard Petrillo
President, RKS Industries, Inc.
Scotts Valley, California

Questionable Value

In his article, "The Fundamentals of BASIC" (PC, Volume 1 Number 11), Fred Brack states that one of his main purposes is to explain the function VAL. However, he neglected to mention the following defect in the way this function is defined in PC BASIC.

If you put A$="1.2%" (i.e. a floating point number followed by the percent symbol, which BASIC uses to identify integer quantities), then the command v=VAL(A$) yields a "syntax error" message.

The way to avoid this is to read the string only up to the percent sign:

```
x=instr(A$,"%")
If v<>0 then v=VAL(left$(A$,v-1))
else v=VAL(A$)
```

Kerson Huang
Marblehead, Massachussetts

In Defense of Dieting

We would like to thank Corey Sandler for reviewing the *Diet Monitor* package (PC, Volume 1 Number 11) and for giving us the chance to reply to some of his criticisms.

Analyzing diet and nutrition is a long, tedious operation when it is done by experts with pencil and paper; a computer can do it fast and in greater depth. *Diet Monitor* is a large system of programs that do this in more detail than any other nutrition system available.

Diet Monitor gives you a detailed analysis of your diet in six reports, which describe nutritional deficiencies and excesses and list the top foods responsible for those nutrients. For instance, if you are short on Vitamin B-12, you will get a "lecture" on the subject and a list of 15 recommended foods. A Histogram graph shows deficiencies and excesses at a glance.

Computers can be fun to use; no one who has ever stood in an amusement arcade or heard a PC try to sing the "Blue Danube Waltz" could ever deny that. But computers also exist to educate and inform. Games have their place, but so do nutrition and health.

G. Ray Camrass
Camrass Corporation
Dover, New Jersey

Corey Sandler replies: *The basis for a valuable, easy-to-use program is present in* Diet Monitor. *I hope it can be fully developed toward that end.*

In Corey Sandler's review of *Diet Monitor*, he says, "there must be more elegantly produced applications than this one." There is at least one. *Nutricalc* by Micromedx calculates 21 nutrients based on the user's recommended daily allowance (RDA), shows results in bar graph and in numerical data form, and shows the user's deficiencies based on his or her RDA.

Moreover, this is an easy-to-use program. Foods are entered by name rather than by code. Besides being easy and fast, this reduces the chance of inadvertent error. It is easy to enter 0765 when you mean 0756, but you are unlikely to enter "chicken" when you mean veal.

The program prompts the user throughout; there is no need to refer to the manual constantly. The manual does not contain a food list, because none is needed. Menu function 3 displays the food directory, which is divided into subdirectories for convenience. Impatient users need not even wait to consult the directory. They can enter the desired food, and if it is not listed as such, the program will search for an alternative. A search for "roll," for example, will produce "hard roll, hamburger roll,

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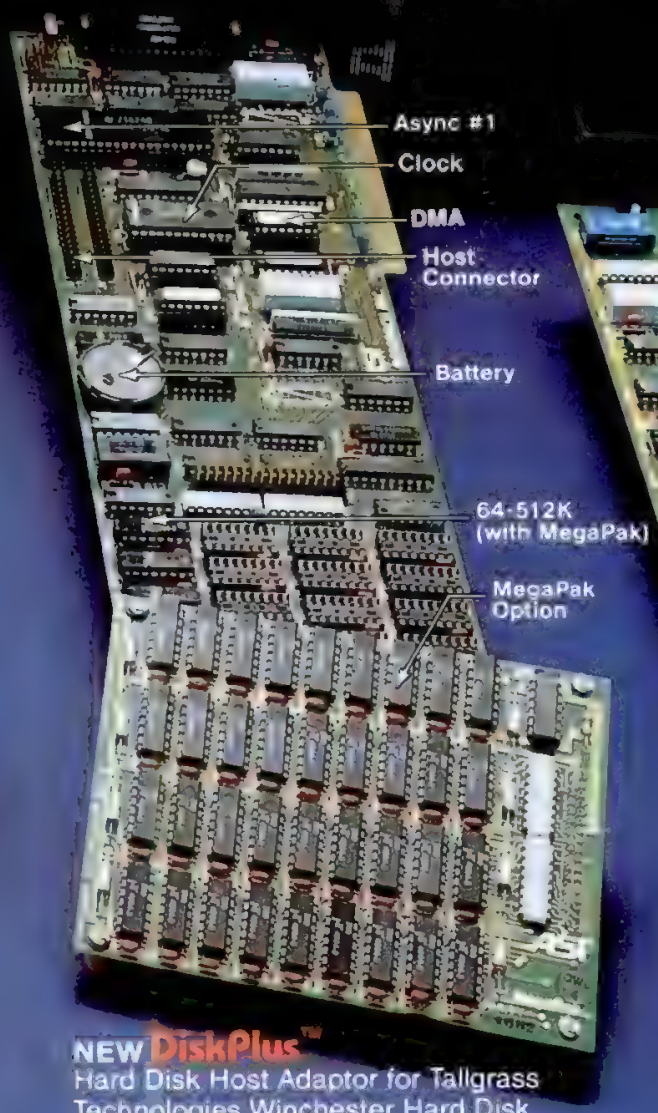
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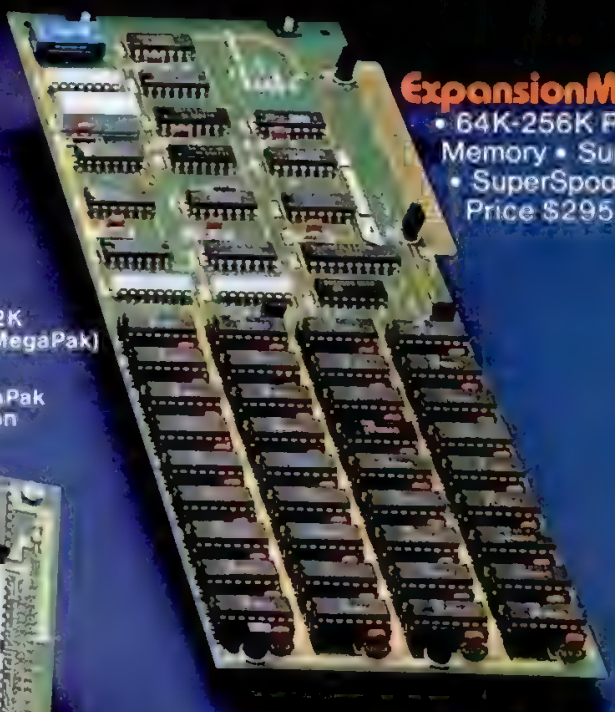
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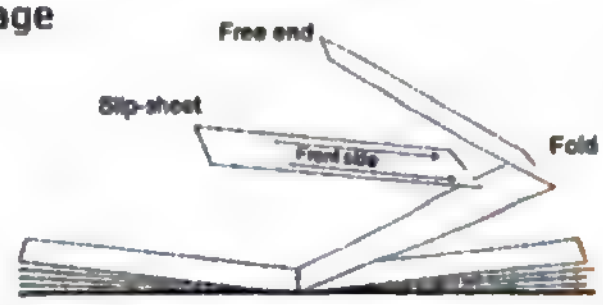
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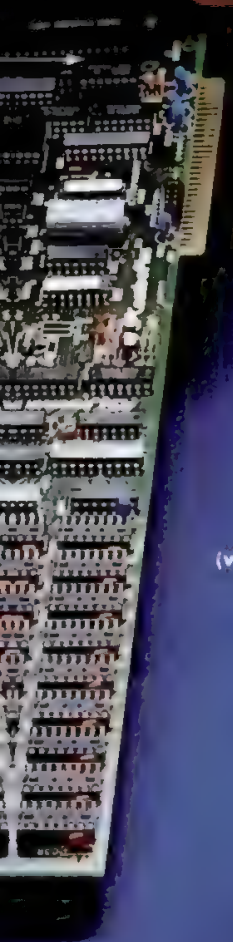
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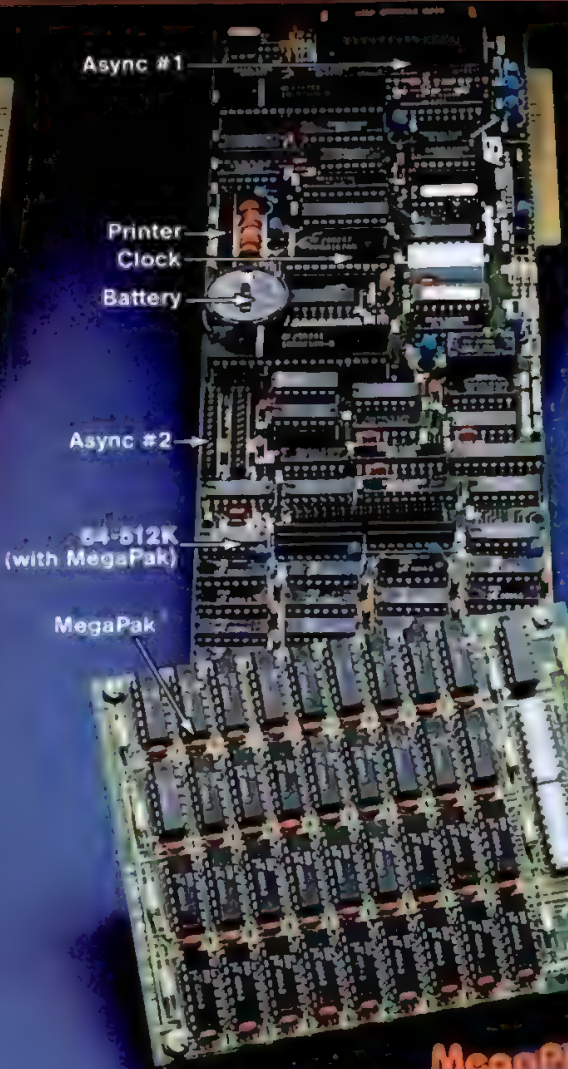
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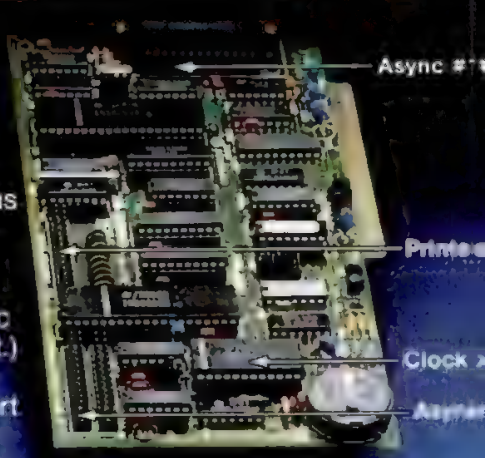
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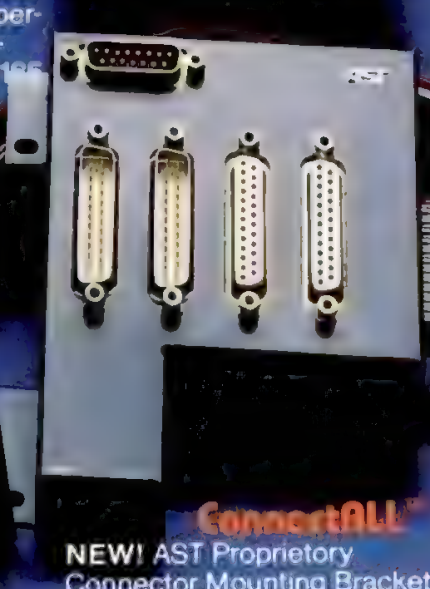




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Letters To PC

frankfurter roll, dinner roll."

Once entered, a meal can be analyzed for one person, based on age and sex, and then re-analyzed for others. Thus a family can easily see that a meal that meets a man's nutritional needs may be inadequate in some areas for his pregnant wife, and oversupply their 6-year-old son.

The program contains about 400 foods and provides room to add 75 more. So if, as Sandler suggested, your diet runs to "rattlesnake meat and dandelions," you can add them to your database.

An updated version of *Nutricalc*, *Nutriplan*, is now available.

Marianne M. Sorrentino
Micromedx
East Northport, New York

Spellbound

I have had my IBM PC for about 3 months now, and so far have used it primarily as a word processor with *Spellbinder*. I wholeheartedly agree with all the positive things Will Fastie had to say about *Spellbinder* in his review (*PC*, Volume 1 Number 11) and disagree with a number of the negative ones.

As Fastie points out, *Spellbinder* makes extensive use of the function keys. I have exercised my eye-brain-finger system with these function keys quite a bit while using *Spellbinder*, and I have come to wonder what the concern regarding function key placement is all about. I find the argument about having to move one's eyes off the screen to look at the function keys a bit weak, and I think that the *Spellbinder* people have done a good job of assigning keys to functions.

I have not used *WordStar*, so I did not experience Fastie's problem of mixing up procedures. But I specifically shied away from choosing *WordStar* because it uses control key sequences. I strongly disagree with Fastie's suggestion that *Spellbinder* should have forgone use of IBM's function keys in favor of the control key sequence approach.

I agree that an index is a necessary improvement for the manual. *Spellbinder* is a powerful and flexible system; as such, there is a lot to learn about it. I confess that I went through some painful hours in learning the system, but now that I have learned most of it, I think it is great. I join Fastie in applauding *Spellbinder's* capacity for handling just about any word processing chore. In addition, I add a user's positive response to some of his user-oriented concerns.

George G. Lendaris
Portland, Oregon

Communications Lingo

After reading the computer communications glossary compiled by Katie Seger (*PC*, Volume 1 Number 9), I felt compelled to comment and expand on some of the definitions.

1. Baud. The baud is not a unit for measuring data transmission rates. It is, in fact, a unit derived from telephony that measures the signaling rate on the line. In simpler modems, this signaling rate is identical to the bit per second rate; this has led to the misconception that the term baud equals bits per second, which it does not. As an example, in the Bell 212, the baud rate on the line is 600 whereas the bit rate is 1200 bits per second.

2. I believe it would be proper to refer to "lease line" as "leased line."

3. SDLC. SDLC is similar to bisync the way Ferraris are similar to Model T Fords. SDLC is a full-duplex protocol while bisync is half-duplex. SDLC is a much more general protocol, allowing outstanding blocks, more complex error-recovery and control than bisync.

4. Synchronous Transmission. The definition given, "in which the timing of each bit of data is previously controlled," would be correct for either synchronous or asynchronous transmission. In synchronous transmission each bit time is controlled as well as each character time, and blocks are submitted asynchronously. In asynchronous transmission, each bit time is controlled and each character time is controlled with each character transmitted asynchronously.

5. Voice Grade Lines. Voice grade lines can be used for the data rates theoretically up to approximately 24,000 bits per second. In a practical sense, they are being used today at rates up to 4,800 bits per second at half-duplex and technology can be expected to provide 4,800 and 9,600 bits per second in full-duplex in this decade. Higher rates will remain difficult to achieve until technologies push to the theoretical maximum of a 3,000 hertz channel.

I hope the above information will be useful in the development of additional glossaries and a better understanding of the communications channels.

Ken Krechmer
Sunnyvale, California

In All Fairness . . .

I've read in *PC* and elsewhere about MicroPro's insensitivity toward end-users of its products, and I don't think the company deserves the bum rap it's been getting.

We use *WordStar* daily to support our small publishing company. Four letters that we wrote to MicroPro regarding bugs in earlier versions of *WordStar* were answered completely and relatively promptly. When the company released new versions of *WordStar*, we obtained copies (complete with documentation) for a mere $5 through our dealer.

Finally, MicroPro didn't copy-protect *WordStar* and even publishes the source code for much of the program. That means it's easy for us to patch it, so we have versions that match our particular hardware and needs.

IBM/Microsoft's *Multiplan*, in com-

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Letters To PC

parison, is copy-protected. We can't load it on our fixed disk, and we panic every time a disk drive makes an unusual groan.

I'm not trying to hype MicroPro, but to let you know that my experience with the company and its products has been positive.

Michael Truffler
AeroGraphics
Deltona, Florida

People always write when things go wrong in their dealings with manufacturers, but they rarely write when they have good experiences. I want to commend Quadram for the excellent support and service I recently received from that company.

I had a problem with my PC when I had an important deadline to meet, and Quadram came to my rescue. I thank everybody at Quadram, especially Tim Farris, the president. Keep up the good work!

A.R. Dabiri
Montgomery, West Virginia

PC Pen Pals

I am currently using a Tecmar LabMaster with my PC to collect and analyze electroencephalogram (EEG) recordings for some psychophysiological research. I am interested in corresponding with anyone else also using this configuration for A-D conversions, whether in EEG research or for some other application.

Write to me care of Department of Psychology, Brock University, St. Catherines, Ontario, Canada L2S 3A1.

Sid Segalowitz
St. Catherines, Ontario

The members of the COBOL Special Interest Group (SIG) of the Capital PC User Group have taken on the task of testing any COBOL compiler available. Four compilers have now been committed; others have been requested. For testing, the Gibson mix is available and a locally written program has been prepared.

We would like to hear from any micro COBOL users who have comments to make related to this testing. Our correspondence address is COBSIG, P.O. Box 2400, West Springfield, VA, 22152.

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Seductive Software

I found Hal Glatzer's feature, "The Automated Agent Helps Performers Get Gigs" (*PC*, Volume 1 Number 11) a real tease! The *IBIS* package sounds worth investigating, but you failed to mention the address of Harper Business Systems.

John Bendell
New York, New York

You can get more information on IBIS from Harper Business Systems, 910 179th Ct. NE, Bellevue, WA 98008, (206) 643-3076—or from John Alman, Traditional Art Services, 2518 SE 17th Ave., Portland, OR 97202, (503) 231-6050.—Ed.

Correction

The IBM Software Guide, published by Microinformation Publishing, contains 2,600 entries, not 160 (PC Communiqués, Volume 1 Number 12).

How to Write to PC

Please send all submissions for "Letters To PC," "User-To-User," "PC Tutor," "PC-Communiqués," or "New On The Market" to *PC Magazine*, One Park Avenue, New York, NY 10016. New Product announcements should be sent to "New On The Market" at the same address. Please indicate the correct department on the outside of the envelope.

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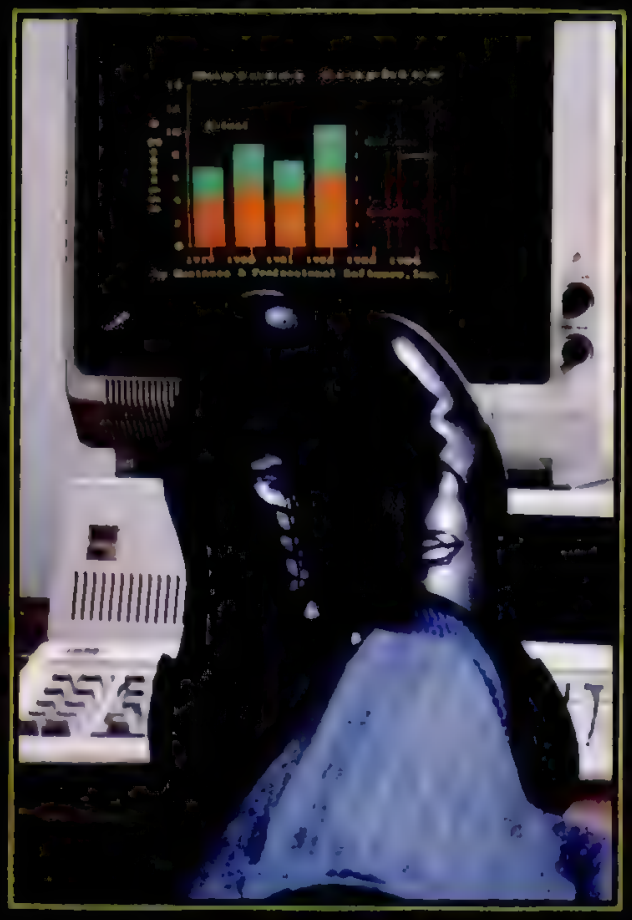
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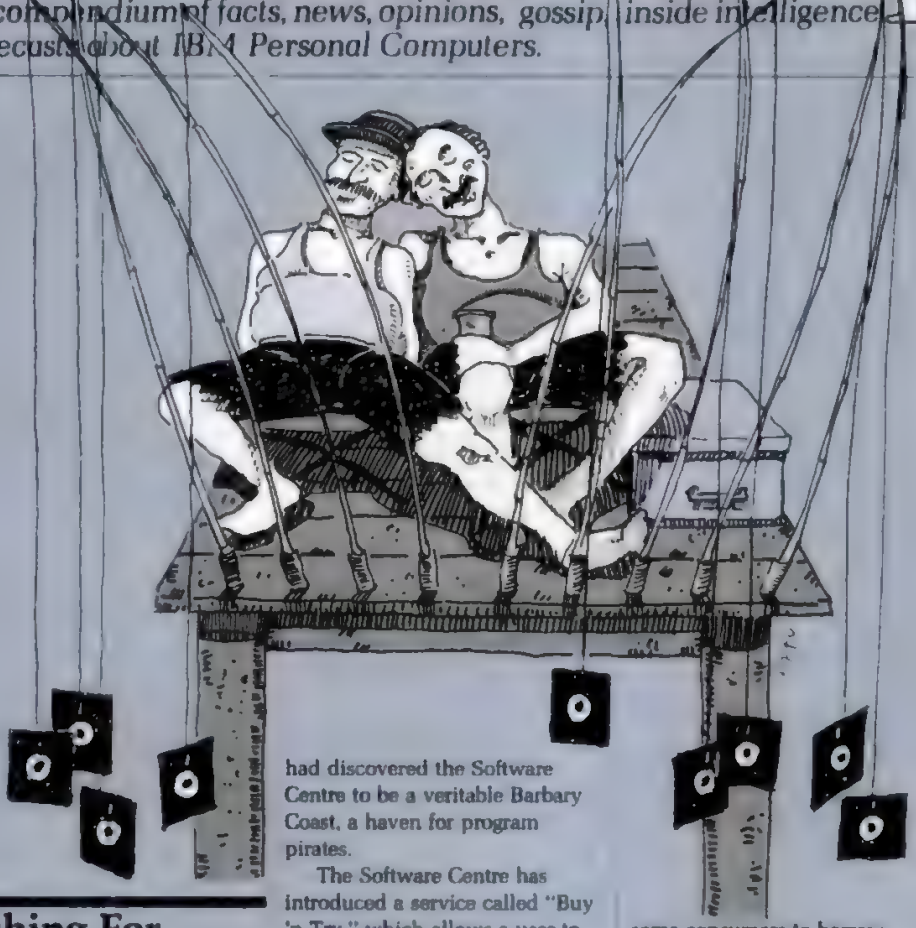
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PC-Communiqués

A compendium of facts, news, opinions, gossip, inside intelligence, speculation, and forecasts about IBM Personal Computers.



Fishing For Pirates

From the way some software producers have been rattling their legal swords, you'd think they had discovered the Software Centre to be a veritable Barbary Coast, a haven for program pirates.

The Software Centre has introduced a service called "Buy 'n Try," which allows a user to purchase a program, then receive an 80 percent refund if he returns the disks and manuals in good condition within 6 months. This arrangement might tempt some consumers to borrow programs and make illegal copies of the disks—"Buy 'n Try" would make it awfully easy to do so for only 20 percent of the software's normal price.

Three software manufacturers—Bug Byte, Imagine, and Quicksilva—have threatened to withdraw their advertising from magazines that carry Software Centre ads, and may take legal action. Bug Byte refuses to supply the Software Centre with its products. These three urge other software producers to join their efforts to smash the new service.

The Software Centre might launch a countersuit charging these manufacturers with restraint of trade. Its manager, Don Malham, insists that the "Buy 'n Try" offer is aboveboard. "We're not doing anything that appears to be outside the law," he said. "We do our best to ensure that people don't copy software. We draw attention to copyright with a sign in the shop and we get people to sign a declaration on their order that they won't copy a program."

Unless legal decisions bring this service to a halt, other retailers are likely to imitate the Software Centre's success with software rental ventures. Either this practice will become as widespread and acceptable as renting out videotaped movies, or the Software Centre's slogan may turn into "Buy, Try, 'n Testify."

Programming For Health And Wealth

The Association for the Advancement of Health Education (AAHE) is sponsoring a contest for original software: programs designed for educational or management applications in schools, homes, clinics, hospitals, health organizations, or business and industry. Entries should be written in BASIC and ready to run on an IBM PC or any other widely used microcomputer. The program should emphasize interaction between the user and the computer.

The top prize will be a $1,500 award. Winning entries will become the property of the AAHE, which will market the programs and pay royalties to the authors.

All entries must be received by November 1, 1983; winners will be announced in the spring of 1984. To receive a contest application packet, write to the Association for the Advancement of Health Education, Computer Software Contest, 1900 Association Drive, Reston, VA 22091.

PC-Communiqués Pays

Do you have news, gossip, or unusual computer tales for PC-Communiqués? We will pay up to $50 for each submission used. You must include your name, address, and telephone number with the item. We will preserve your anonymity if you wish. All submissions become the property of PC and are subject to editing. Our User-to-User section also publishes and pays for readers' submissions; that section features tips, problem solutions, and short programs or routines. Please send submissions to the appropriate department—PC-Communiqués or User-to-User—at PC, One Park Ave., New York, NY 10016.

PC Communiqués



Give Us This Day Our Daily Data

In the twister and tornado lands just below Austin, Texas, a small but hardy band of Catholic monks is aided in its worldly pursuits by three microcomputers.

The head monk at St. Benedict's, Brother George Gammons, said that he and his brother monks (one is a woman, by the way) use a transportable Osborne and two Imsai desktop computers to keep track of the monastery's business ventures. These include managing a cattle herd and a small farm—typical vocations for monks as well as the region. The monastery has diversified further with a photography service and a book publishing company. Its first volume was titled *Your Friendly Neighborhood Monk*.

St. Benedict's Monastery in Welder, Texas is an independent, noncanonical Catholic organization. Though its trinity of computers has been a blessing in such secular tasks as generating mailing lists for book promotion and keeping records on the herd of cattle, Brother Gammons says that the monastery intends to upgrade by purchasing an IBM PC as soon as it can afford one.

With all the prayers coming morning, noon, and night from the sacred heart of Texas, perhaps somebody will hear them and lighten the brethren's toil with a PC. It might be a modern miracle.

New Chip, New Languages

IBM has finally provided the official answer to one of the worst-kept secrets of its PC and PC-XT motherboards: It has released the 8087 Math Co-processor, a chip to be installed in the vacant socket next to the computer's 8088 "brain."

IBM's 8087 option kit includes the co-processor and a "current-level" 8088 chip for a price of $260. The replacement 8088 is required for early-model PCs that would otherwise be incompatible with the new device. The 8087 co-processor extends the repertoire of the 8088 to include advanced mathematical capabilities and increases the speed of floating point arithmetic, logarithmic, and trigonometric functions significantly—in some applications as much as tenfold.

Also announced in June was IBM's APL (A Programming Language), which can use the advanced capabilities of the 8087 chip for greater speed. APL was pioneered by IBM for its mainframes and minicomputers. In addition to operating on the PC, APL is capable of exchanging workspaces and data files with an APL system on an IBM/370. The price for the language is $195.

A version of LOGO, a high-level language that treats data as objects that can be easily manipulated through simple commands, was also announced by IBM for fourth-quarter release at $175.

The *Times* Explains Micros

An article on portable computers, in a recent issue of the *New York Times*, explained memory size terminology with this helpful footnote: "In kilobits, 8k equals 8 kilobits." Thanks. That really clarifies the issue.

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Phillip Estridge
IBM Product Manager



Oscar's Guardians Look At Software Security

The next time the words "the envelope, please," are heard at Price Waterhouse, it may be to mail you a copy of a free booklet, *Minicomputers and Control*. In this short treatment, the accounting firm, best known for its participation in the annual Academy Awards ceremonies, warns users of small computer systems that they might overlook important issues of security and control.

"Increasing computerization brings with it the potential for error and fraud, unless management establishes appropriate safeguards," said S. James Gaston, a partner in the firm's Toronto office. A programmer might accidentally change a number, such as a discount rate, and cause thousands of dollars worth of incorrect invoices to be issued before the mistake is discovered. Or an employee might know enough about programming to instruct the company's check-writing program to issue him a $20,000 check.



The booklet provides jargon-free answers to 30 questions that business managers have asked, and covers topics including passwords, segregation of duties, data recording and review, edit routines, data storage, and control totals.

While this guide is aimed at minicomputer users, it should also provide timely warnings to those planning to put the PC to work in multi-user business situations. Security and control methods tend to be even more neglected in the microcomputer field.

A free copy of *Minicomputers and Control* can be obtained at any of Price Waterhouse's 329 offices or by writing to Gerald M. Ward, Price Waterhouse, 1251 Avenue of the Americas, New York, NY 10020.

Pirate Games

A new French software house, Ediciel, has an unusual attitude toward program pirates: "If you can't beat them, then play games with them."

Ediciel is a joint venture of Matra, a high-technology group, and Hachette, France's largest publishing company. It produces business, educational, and game software for the IBM PC, Apple II, and TRS-80 III. By the end of this year Ediciel will introduce 25 products for the French-speaking market.

One of the programs in Ediciel's initial offering is an arcade-type game, *Naja*, which will be promoted with two contests. One prize will be awarded to the player who achieves the highest score with *Naja*. The other prize is reserved for the first person who can break the disk's copy-protection scheme and present Ediciel with an illicit reproduction of its game.

Ediciel seems to accept software piracy as a fact of life in the computer business; it would rather "wink at the pirates" than fight. On the other hand, this manufacturer seems confident that its disk-protection method is clever enough to offer the pirates a challenge worthy of a prize.

Return of The Dream Book

Last fall, to celebrate the first birthday of IBM's Personal Computer, *PC Magazine* found that over 1,250 PC-compatible items had appeared in less than a year. Descriptions of all these products appeared in the fifth issue of *PC*.

Since last fall, even more products have been produced. Your demand for the latest, most complete information will by the end of August be satisfied by *PC: The Product Directory*.

This independent guide to products and services for the IBM PC and XT will include over 500 pages describing thousands of pieces of hardware and software, along with accessories, books, and other resources.

PC-Communiqués



Mental and Digital Cruelty

"Computer Named As Contestant In Divorce." The story behind this headline might seem too far-fetched to even be printed in the *National Enquirer*, but it's true. John Bear learned the sad details while researching his book *Computer Wimp* (to be published in August by Ten Speed Press).

Bear reports on a long-married California couple with two teenaged sons. A happy family, until the husband came home with an IBM PC. Over the subsequent 6 months he barred the rest of the household from using the machine and sequestered himself in the family room, night after night

When his wife and sons tiptoed past his door, they heard "peculiar sounds." Perhaps the husband was playing games, but he vigorously denied such charges.

The wife's lot in this story is predictable, even if this may be the first "software opera" plot to emerge in the real world. "If it had only been another woman, I could have competed," she might well lament.

At last report the couple had separated. In their impending, unamicable divorce proceedings, the seductive PC is expected to be named as a contestant.

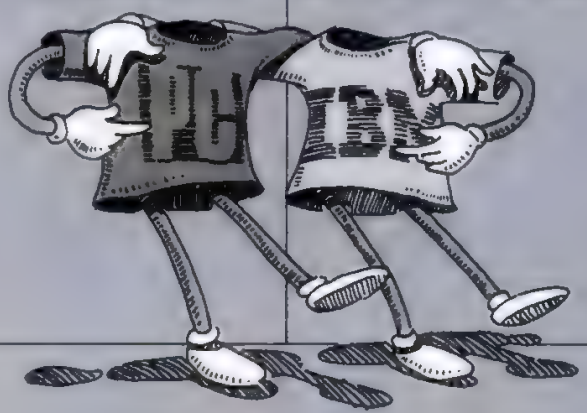
What can be done to redeem the PC's seamy reputation as a homewrecker? Marriage counseling by modem, perhaps?

Wearable Software

Real PC users don't wear polyester. So say the entrepreneurs at The Next Event. They're coming at the PC market with a peripheral made of 100 percent natural fibers called Wearable Softwear—the first PC you can wear on your back.

This line of T-shirts, sweatshirts, polo shirts, sweaters, and other wearables, designed with fashion conscious PCers in mind, will bear PC slogans and logos. These garments should be hot items by early fall, when a factory about 40 miles from Boca Raton begins producing them.

Although the company is new to the micro market, it was a logical next step for its staff, according to Jeff Max, vice president for marketing. We've been computer buffs and bit heads for a long time," he said. "Our business is run on a PC, and it's helped us a great deal."



He first contacted the legal staff at IBM's Armonk headquarters. "Their response was that they only use the logo for IBM proprietary products. They thought it was a great idea, but 'not our policy,' " he said.

Max finally broke through with Gary Conrad, the director of marketing in Boca. "I sent him samples of items with the PC symbol imprinted, and he thought they were terrific."

What styles will Wearable Software design for the typical PC user—"A small to medium size business person, fashion conscious, and interested in good quality"? Max said, "Most of the products we'll tailor for PC will be 100 percent cotton or wool, as opposed to polyester blends. We're thinking about oxford button-down shirts, and ties are always possible."

To find out how to access this most peripheral of PC-peripherals, write to Wearable Software, P.O. Box 781, Newport, RI 02840.

What's next, PC-chocolates?

—Lisa Kleinman

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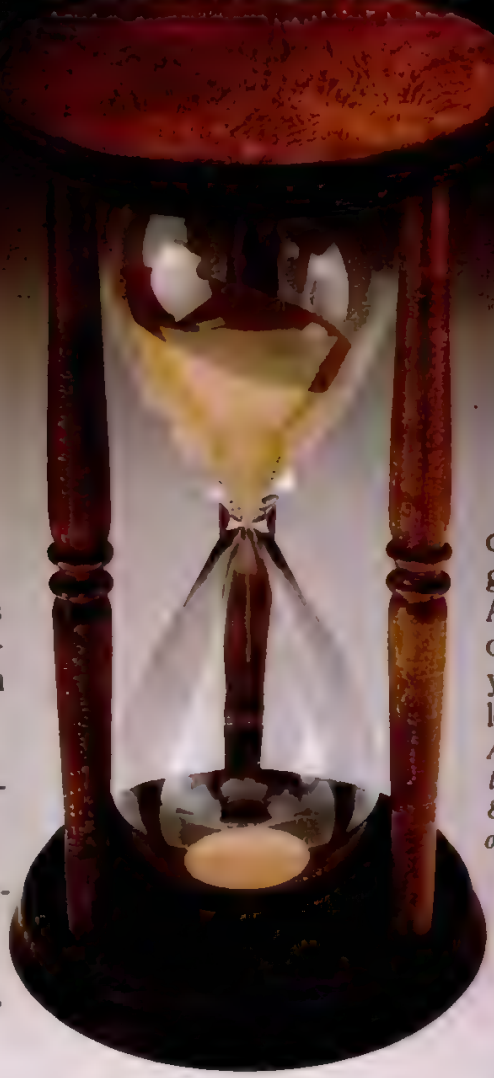
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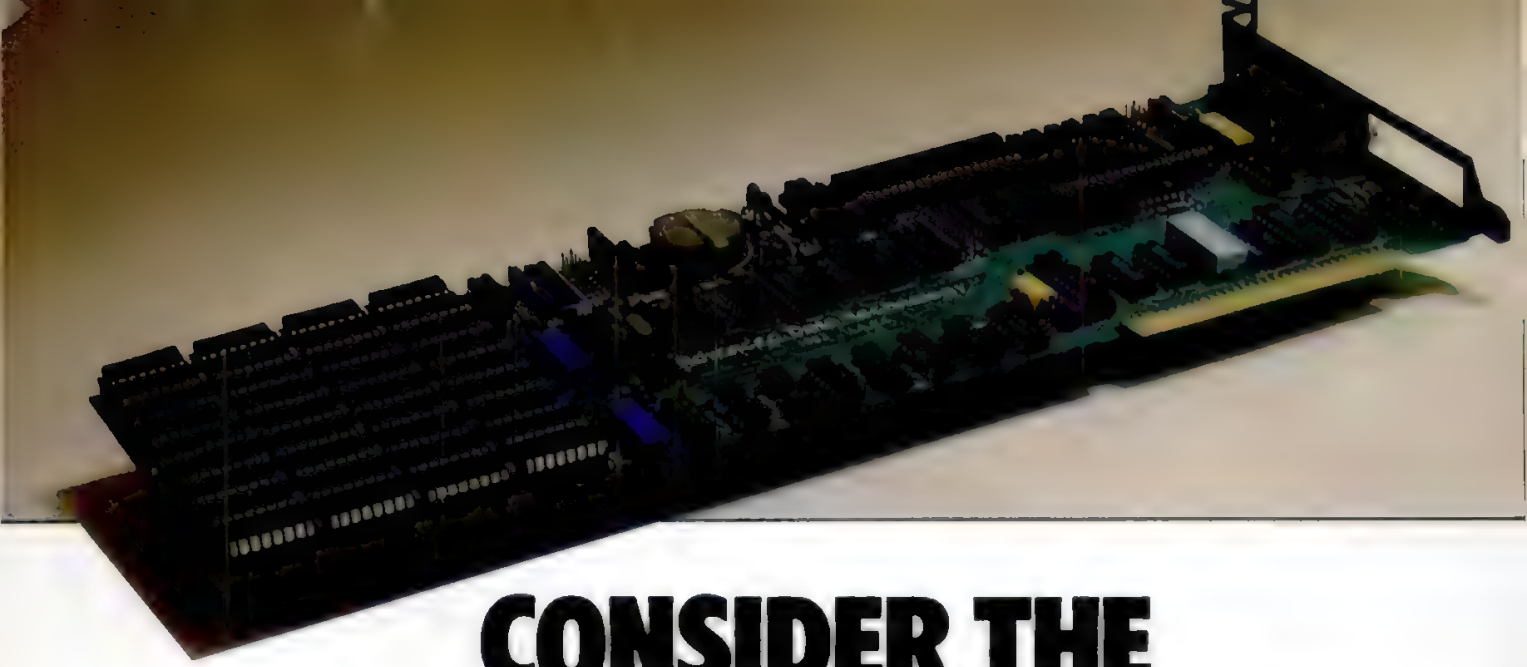
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CIRCLE 102 ON READER SERVICE CARD

MARK ZACHMANN

Questions about Spinwriter problems, colors in dBase II, files on hard disks, and CALLing assembly language programs from BASIC are answered in this session with the PC Tutor.

PC Tutor



Finding the Fonts

Q: As part of my work, I have to use two type fonts in word processing. I would like to use both alphabets in WordStar, which only uses the first 128 characters on the ROM chip on the IBM monochrome adapter board. What is your advice on how to go about doing this?

Joshua Sommer
Palo Alto, California

A: *The monochrome adapter card is not well suited to using multiple type fonts. Even though the character chip has room for additional character sets (as you know, it already has two sets on it), switching between sets requires a hardware modification.*

It is truly amazing the number of questions I get asking about how to use the full 256 characters with WordStar. The best answer I can give is that although WordStar is an excellent text editor, it is just not designed for that sort of work. Perhaps you should investigate other word processing programs.

There are really two reasons for the inaccessibility of the additional 128 characters. First, the additional set of characters is unique to the IBM PC. As such, software and hardware manufacturers would sacrifice compatibility by making these special IBM characters accessible. Second, WordStar (and many other such programs), were originally designed for microcomputers that operated with CP/M-80, which only had 128 characters specified.

Mastering Macroassembler

Q: I have been doing all of my programming in BASICA and compiling the results when I need speed. I find that even more speed is needed to make laboratory use of my PC. Can you recommend a readable textbook on the IBM macroassembler package? Will the assembler speed up my code appreciably?

Sid Segalowitz
St. Catherines, Ontario, Canada

A: *I know of no suitable books on the macroassembler. I have used the assembler extensively and, even as an experienced programmer, I found that the manual leaves a lot to be desired in readability. A new book has been announced, but I have not seen it yet, and so can offer no assurances as to its suitability.*

Writing your code in assembler should improve speed by at least a factor of two. There are a few other approaches possible to make faster programs. You might wish to investigate programming in another high-level language. I have found that the Lattice C compiler gives excellent results with remarkable speed. With it, linking assembler routines is quite easy.

One advantage of using another language is that BASIC routines often are slow due to the convolutions required by programming in a nonstructured language. For example, using a Pascal CASE or C language SWITCH statement can often save a lot of of time when compared with the multiple IF/THEN/ELSE approach required by BASIC.

Unhappy Returns

Q: I have a PC with PC-DOS 1.1 and an NEC PC-8023 dot-matrix printer. I have run into one problem. If I set the DIP switch on the printer so that a carriage return does not generate a new line, then listings and printouts are fine; however, if I use Shift-PrtSc then everything prints out on one line. If I set the DIP switches for carriage return/line feed, then listings are always double-spaced, but Shift-PrtSc works fine. Is there any way this can be resolved?

Also, do you know of any software that provides graphics screen dump for the printer?

James Bettman
Chapel Hill, North Carolina

A: *That is a strange problem indeed. I can't see why you'd be experiencing any*

trouble with your printer. You should set it so that a carriage return does not generate a new line. This setting has worked flawlessly with every printer I have used (including a possibly different version of the NEC PC-8023), so perhaps your hardware is at fault. You might check your cable to ensure that the hardware handshaking signals are being transmitted.

As for graphics screen dump programs, the only routine I happen to know of that will work with the NEC is Frieze distributed by StarSide Engineering. I am the author of that package—hence my familiarity—there doubtlessly are others on the market equally as good.

Copy Protection

Q: I am interested in developing and creating software that will prevent a program from being copied. Briefly, how is this done?

David Kawa
Melbourne, Florida

A: What you are discussing is copy-protection. Although some popular games may deserve that treatment, I recommend, in general, that people avoid buying and producing copy-protected software. Users, obviously, can't make back-up copies to protect against those occassional accidents. Copy-protection methods also cause problems in transferring programs to hard disks (this dilemma has come up more since the introduction of the IBM XT), and running with new operating systems and slightly non-standard hardware. These problems make it invariably an expensive proposition for the consumer to use copy-protected disks.

It has been said that the best possible software protection a manufacturer can provide is exquisite service and frequent updates with new features available only to licensed purchasers.

Exclusively BASIC?

Q: I recently purchased an IBM PC. During my research prior to the purchase I noticed that all of the software available for micros was written in BASIC. Other than BASIC being the micro's native language, why are there so few COBOL packages around?

Barry Silver
Machancsville, Virginia

A: BASIC isn't used exclusively with microcomputers, but most program listings (source code) you see are written in BASIC. Most of the software around is written in one of these languages: C, Pascal, compiled BASIC, and assembler. However, those languages are all compiled, so the end result is a machine language program (an .EXE file). You can't see the source code to modify it, which prevents you from making up your own version for resale. Very few companies are willing to sell the source code to a software package, due to the possibility of theft.

WHY ARE there so few COBOL packages around?

There are two reasons you see only BASIC source code. First, these programs are written for the BASIC interpreter and must be provided in source code form. Second, much software is written by computer novices who are most familiar with BASIC. Hence, what ends up on the market is either a compiled program or BASIC source code.

As for COBOL, there are one or two packages that were originally written in COBOL for the PC, but again the end result is a machine language program, not a source code.

Spinning Both Ways

Q: Despite assurances from our computer store to the contrary, we have had difficulty using our NEC 7715 Spinwriter with the PC. When we used it with our original computer it did everything we asked for including boldfacing. Now, not only will it not boldface, but it refuses to print bidirectionally. Is there a way we can improve this situation? On repeated calls to NEC, IBM, and MicroPro we have come up empty.

Marc Eiseman
North Bay Shore, New York

A: I own an NEC 3550 printer and it does print bidirectionally, automatically. It will print unidirectionally when the buffer is not full enough, however. It may be that you are running at too slow a baud rate to fill the 7715 buffer (assuming you are using a serial interface), hence the unidirectional printing. You might try increasing the baud rate and see if that helps. WordStar does have a way to do bidirectional printing, but my understanding was that this would cause alternate lines to print backwards on a 7700 series Spinwriter.

As for boldfacing, this is a feature enabled by software. Since you mentioned MicroPro, I must assume you mean that your WordStar is not performing the boldface correctly. The simplest solution to the problem is to define two of the user features (USR1 and USR2) to turn the boldfacing on and off. Then, preceding a string with a Ctrl-Q will turn on boldface and ending the string with Ctrl-W will turn it back off. With version 3.20 of WordStar, the locations in question are 77F and 784 hexadecimal. I would use the autoshadow feature which on the 3550 is enabled by the Esc key followed by G, and disabled by Esc H. You would key in the following underscored material in response to prompts

```
A>DEBUG WS.COM
-E77F 2 1B 'G'
-E784 2 1B 'H'
-W
Writing . . . bytes
-Q
A>
```

The second and third lines each will tell WordStar to send two characters: the Escape and G or H.

If you are using a different version of WordStar, then you will need to contact your dealer, who should be able to help.

Hard Limits

Q: What is the maximum number of files that you can have on a hard disk drive, with or without a removable cartridge?

Nassos Kitsios
Alexandria, Virginia

A: Before version 2.0 of PC-DOS, there was no answer to this question, as version 1.1 did not support hard disks at all. With version 2.0, the answer is that the limit is determined by the format of the disk, which is specified in software.

The standard value, I believe, for the IBM XT is 512 files. This is only the number of files in the root directory, however. By using subdirectories, you can increase the number of files to the point of no return.

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CIRCLE 138 ON READER SERVICE CARD

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Coloring dBase

Q: An article on "Kaleidoscope" (*PC Magazine*, Volume 1 Number 10) included a section telling how to obtain color graphics from Assembler and BASIC programs. I am interested in using color graphics in *dBase II* programs, if possible. Is there any way to turn colors on or off, and control screen intensity from within *dBase II*?

William Silverman
Washington, D.C.

A: *If you have PC-DOS 2.0, then you can turn colors on and off. To use this feature, you need to enable the ANSI.SYS program. This is done by putting the ANSI.SYS file on your boot disk, and then creating a file called CONFIG.SYS that contains a line reading DEVICE=ANSI.SYS. If you use any of the other options of PC-DOS 2.0, such as buffering, they can also be included as lines in the CONFIG.SYS file.*

When you boot up the PC, the ANSI.SYS file will be loaded into memory. To use color, you now need to send an Escape sequence to the console. Refer to page 13-8 of your PC-DOS 2.0 manual for a discussion of which codes will generate which colors. For example, pressing the Esc key followed by [7m will start a display in inverse video.

Thus, you would use the command ? chr(27)+"[7m" to enter inverse-video mode, or perhaps ?chr(27)+"[33m" to get a yellow foreground. Line graphics are another matter entirely. I doubt that dBase II is capable of such.

Disabled Break

Q: Can you tell me how to disable the Ctrl-Break function like some software packages do? I would like the computer to beep when someone attempts to break.

Ali Dabiri
Montgomery, West Virginia

A: *When a PC-DOS program (other than BASIC) is run, the Ctrl-Break function runs to a software routine: interrupt 23. When someone hits the Ctrl-Break sequence, the computer goes to a location in memory governed by the contents of a double-word (4 bytes) pointer in memory corresponding to the interrupt 23 hexadecimal value. These four bytes are located at 0000:008C hex. The first two bytes are the offset address of the subroutine call. The second two bytes are the segment address of the subroutine call. Just change that pointer to another value (i.e. to point to a subroutine that beeps).*

Refer to page D-3 of the PC-DOS 2.0 manual since, unfortunately, any more explanation is beyond the scope of this column.

With BASIC 2.0 you should use an ON KEY sequence to trap a Ctrl-Break. This would be done via the following code:

```
10 REM Assign Ctrl-Break to key
15
20 KEY 15,CHR$(4)+CHR$(70)
30 ON KEY (15) GOSUB 1000
40 KEY (15) ON

1000 BEEP : RETURN
```

Counting Parameters

Q: I use the CALL instruction of BASIC frequently for machine control applications. Unfortunately, when I CALL a subroutine that expects three parameters and I only give it two parameters, the end result is that the stack gets messed up and my machine dies. Is there any way to avoid having this happen every time? Perhaps there's a way to find out how many arguments were given to the CALL instruction?

James Peterson
San Jose, California

A: There are at least two possible solutions to your problem. The simplest way is to use a string argument to your calls. I would suggest using something like the approach in Figure 1.

In this example, the XFER program should take the first argument as the offset address of the subroutine to be called. Then have XFER translate the second argument, which will be a string, into a series of numeric arguments. (Refer to the BASIC manual on CALL conventions to see how to read a string.)

When XFER has finished translating from string to numeric, it can push the numeric arguments onto the stack and then call SUBRT from assembly code. Now, SUBRT does not need to pop the stack (via a RET n), since XFER can do it, as in Figure 2.

Taking COMMAND

Q: I would like to call COMMAND.COM from within a program to perform some PC-DOS type of operations or perhaps run

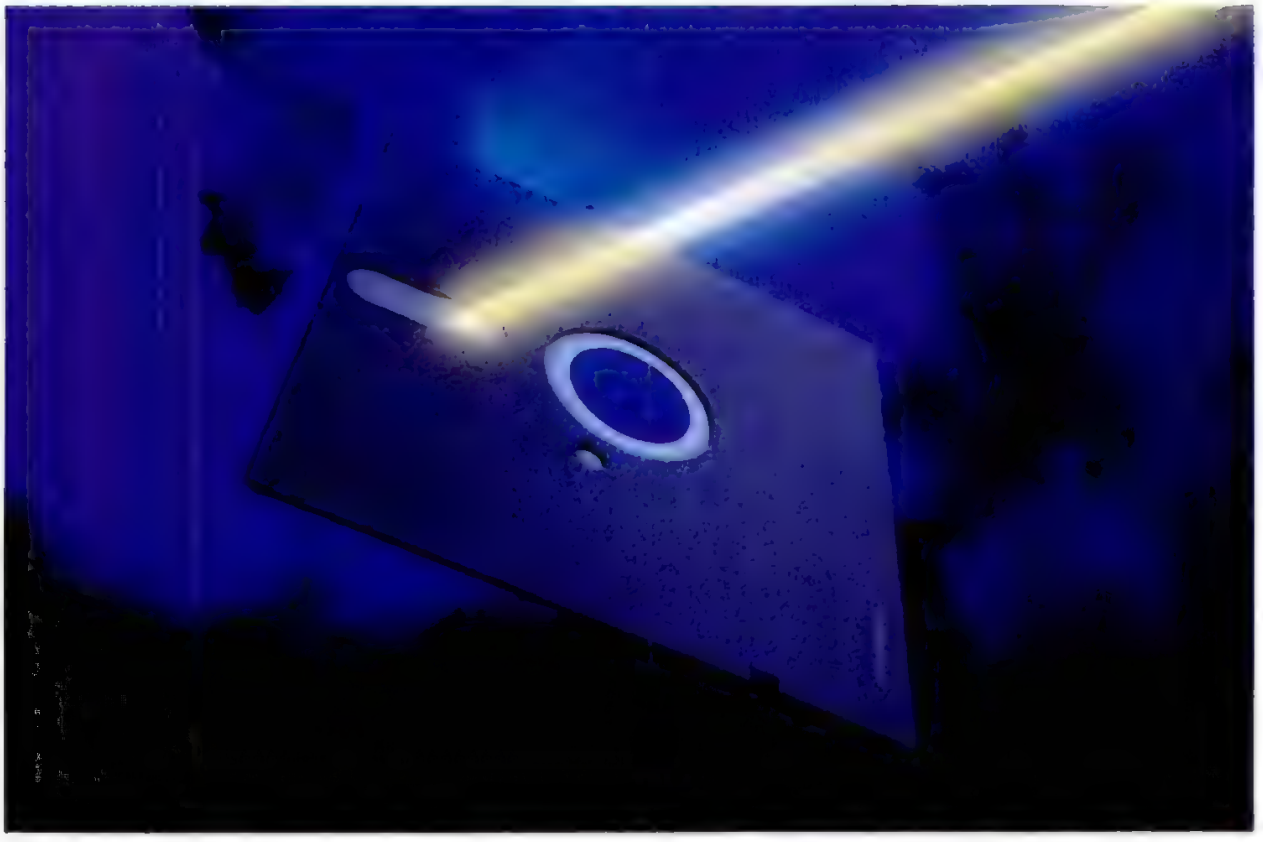
Figure 1: Method of using string arguments for calls in BASIC.

```
10 REM Assume SUBRT is your machine language routine
20 REM Assume your arguments are A,B, and C
30 REM Assume XFER exists, as described below
40 ARG$ = STR$(A)+' '+STR$(B)+' '+STR$(C)
50 CALL XFER(SUBRT, ARG$)
```

Figure 2: An assembly language routine using XFER.

```
      ;leave enough room for maximum number of arguments
ARG1  dw   ?              ;argument 1
ARG2  dw   ?
ARG3  dw   ?
XFER  push BP             ;save base pointer
:     mov  BP,SP
     ;perform the translation, saving into ARG1, ARG2, . . .
     . . . . .
     ;now set up for the called routine
      push CS:[ARG1]
      push CS:[ARG2]
      push CS:[ARG3]      ;and so on
      mov  DI,[BP+8]      ;get the subroutine address pointer
      call [DI]           ;don't alter the BP
     ;now restore the stack
      mov  SP,BP
      pop  BP
      ret  4              ;always two arguments to XFER
```

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CIRCLE 390 ON READER SERVICE CARD

a program. Despite claims to the contrary, PC-DOS 2.0 does not seem to make this very simple. Can you suggest a way to do this?

Phelps Gates
Chapel Hill, North Carolina

A: *The first thing you need to do is deallocate some memory so that PC-DOS has room to maneuver in. When a program is first loaded by PC-DOS 2.0, all available memory is allocated to it. Suppose you really only need 64K (or 1000hex paragraphs—a paragraph is 16 bytes). To deallocate the rest of memory you would set ES to the value of the program segment prefix, set BX to 1000h, and then perform a PC-DOS SETBLOCK call (call 4A). Now ES+BX is the segment value of where to start loading COMMAND.COM.*

Then, set up a command line containing the instructions you wish COMMAND.COM to perform, preceded by a /C: see pages 10-9 of the PC-DOS 2.0 manual and note that the first byte of the command line contains the command line length. Now set up the pointers as defined on page D-45 of your PC-DOS 2.0 manual. Then Execute COMMAND.COM (see call 4B on page D-44).

For example, the string /C DIR B: will give you a directory of the files on B. As a means of testing this out, you can use the DEBUG program, like this:

```
A>DEBUG COMMAND.COM
-n/c dir b:
-g
```

The second line sets up the command line; entering the third line runs COMMAND.

Correction

A few months ago I stated that EasyWriter was incapable of working with a RAM-disk program thanks to it not using PC-DOS. It turns out that there are four versions of EasyWriter around. Two of these (EasyWriter 1.1, and a new version of EasyWriter II) do use PC-DOS and are compatible with RAM-disk programs and hard disks. Sorry for the confusion.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. */PC*

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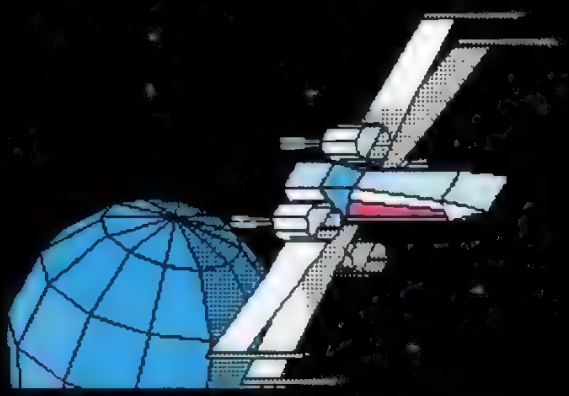
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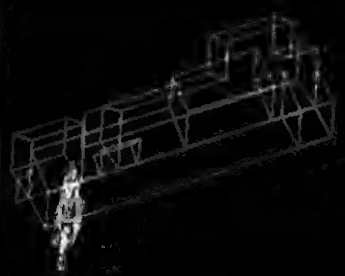
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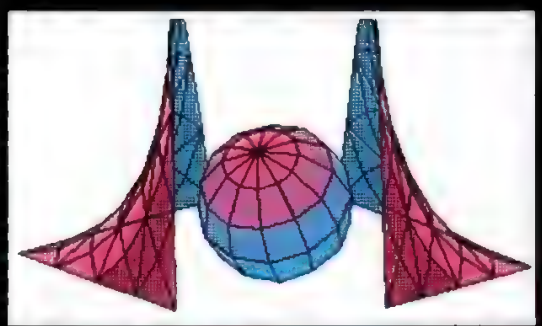
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Future terminal protocol emulation software will integrate into our programmable hardware controller. And, Linkup's high-speed data throughput will allow you to take full advantage of increases in common carrier transmission line speeds with no modification. Linkup is available for users and systems developers who wish to integrate our communications capability into their unique systems, on a select OEM basis.

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If you want to communicate, call ITI toll-free 800-431-3460 for additional information.

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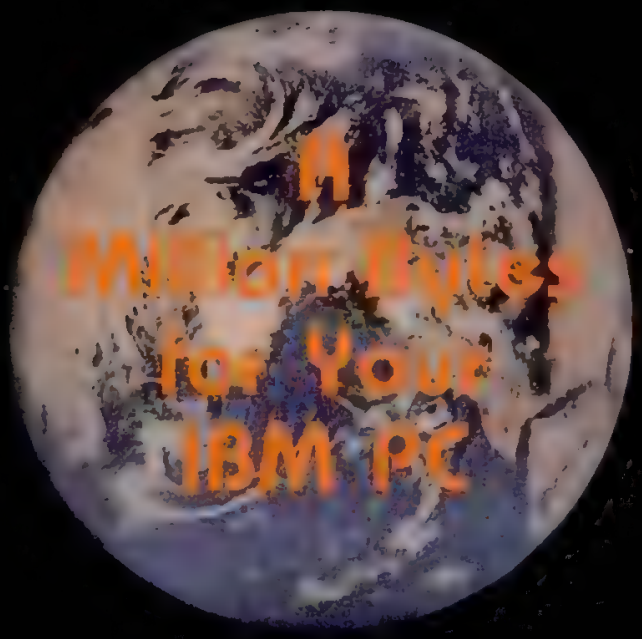
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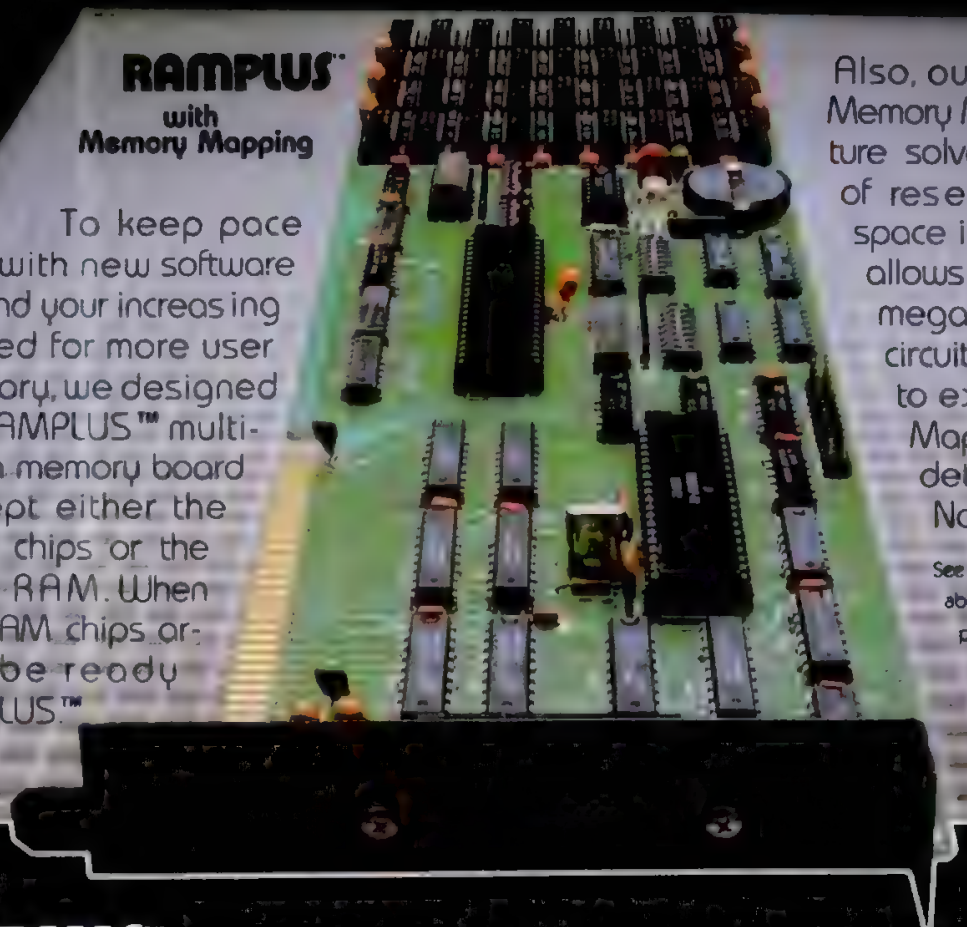
Speed:
Continuous throughput of 56 Kbps Synchronous, 19.2 Kbaud Asynchronous
Terminal Emulation Modes:
TTY, ASCII Block Transfer, DEC VT 52/100, IBM 3101, IBM 2780/3780, and future options include 3270, 5250, Tektronix.
File Types:
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Automatic Modes:
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Modems:
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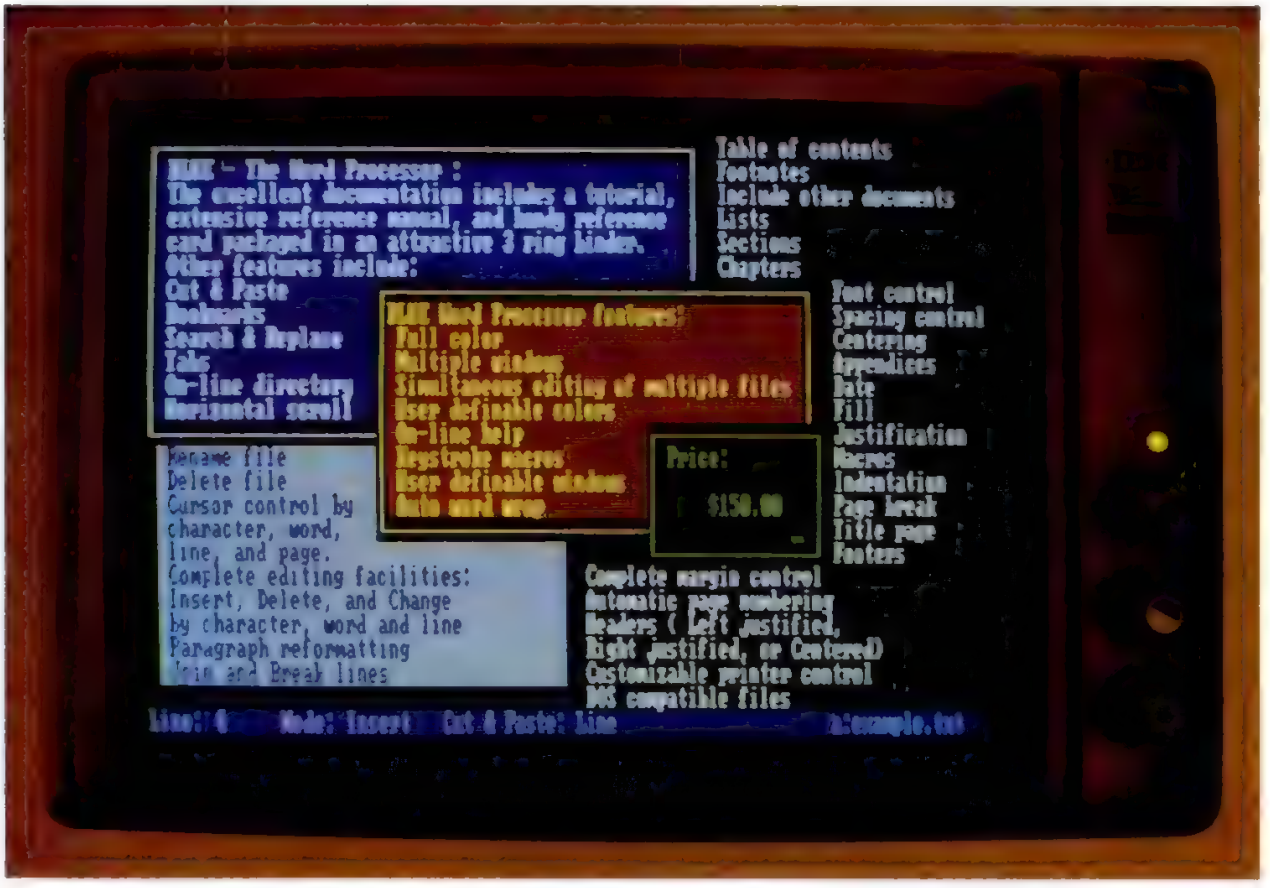
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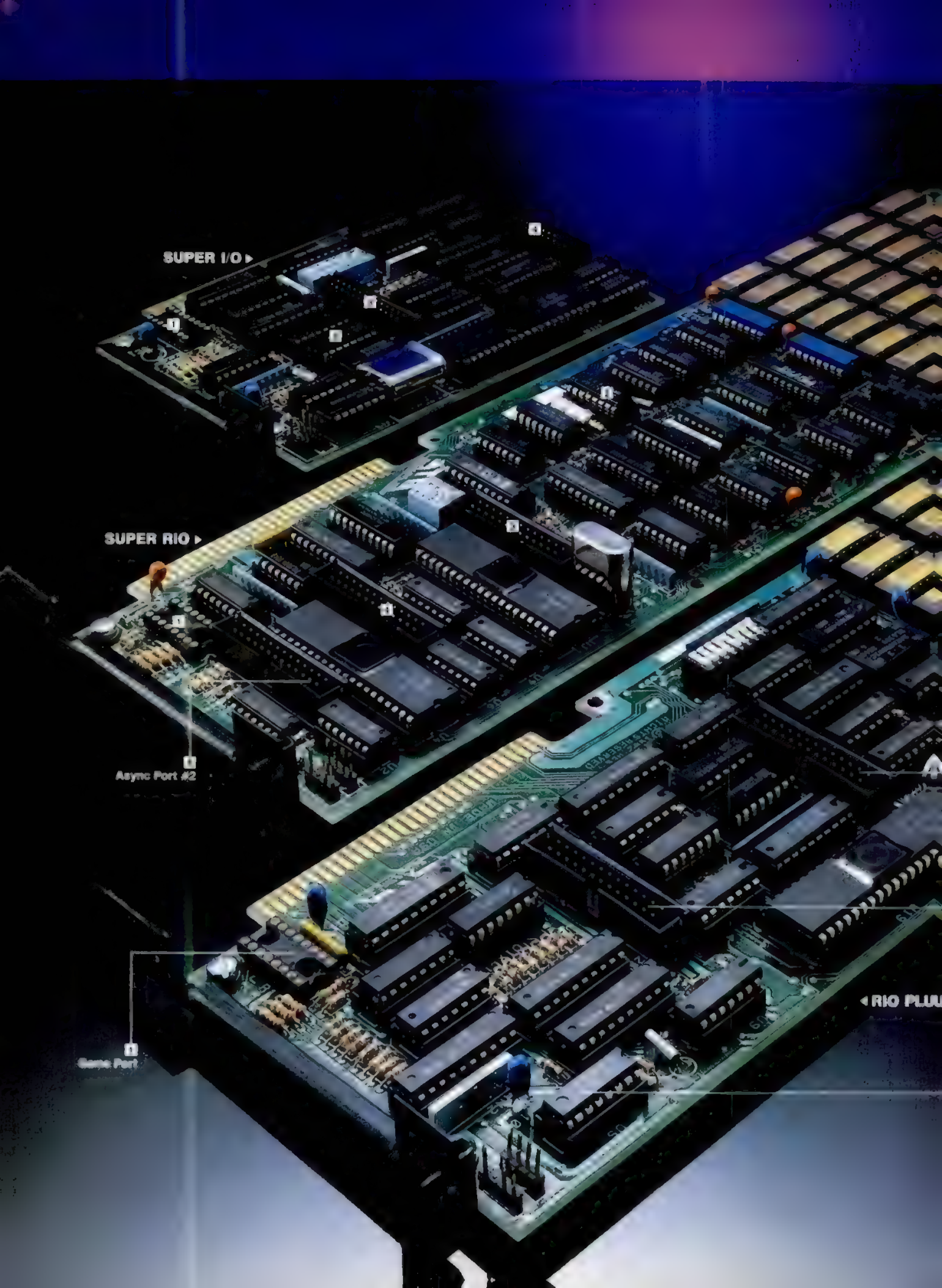
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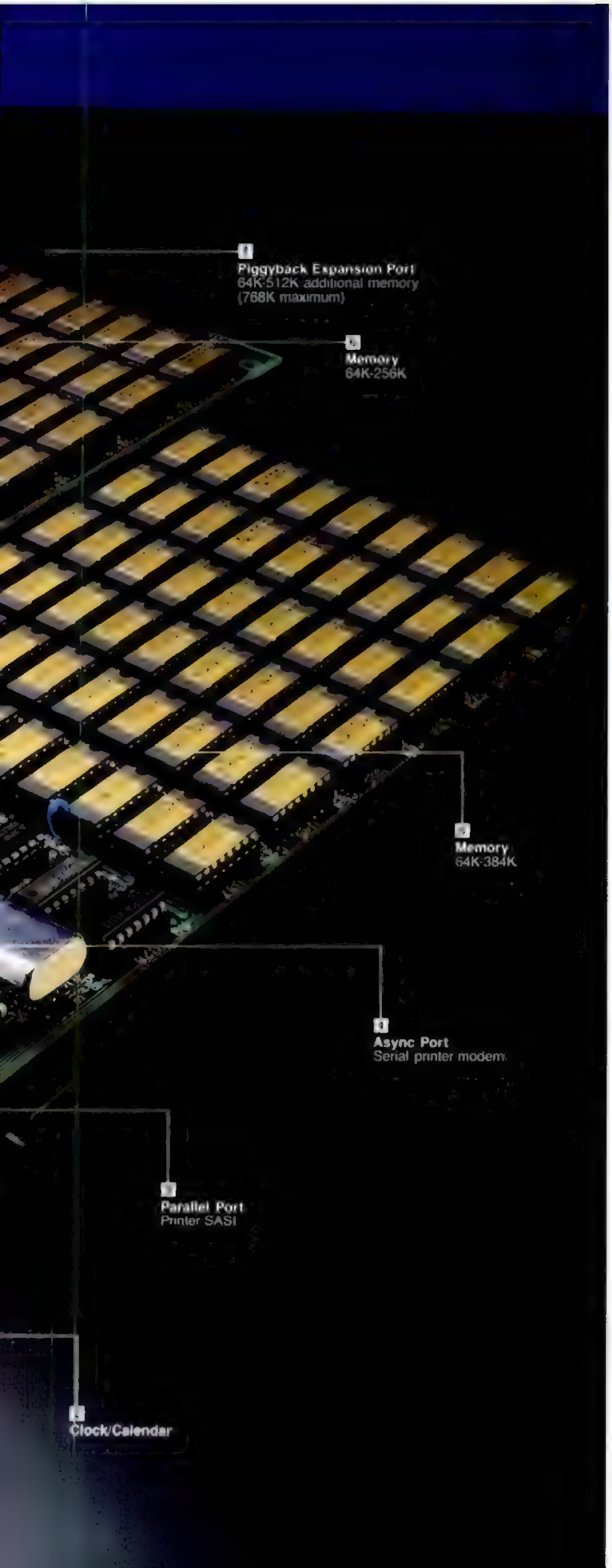
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Async Port #2
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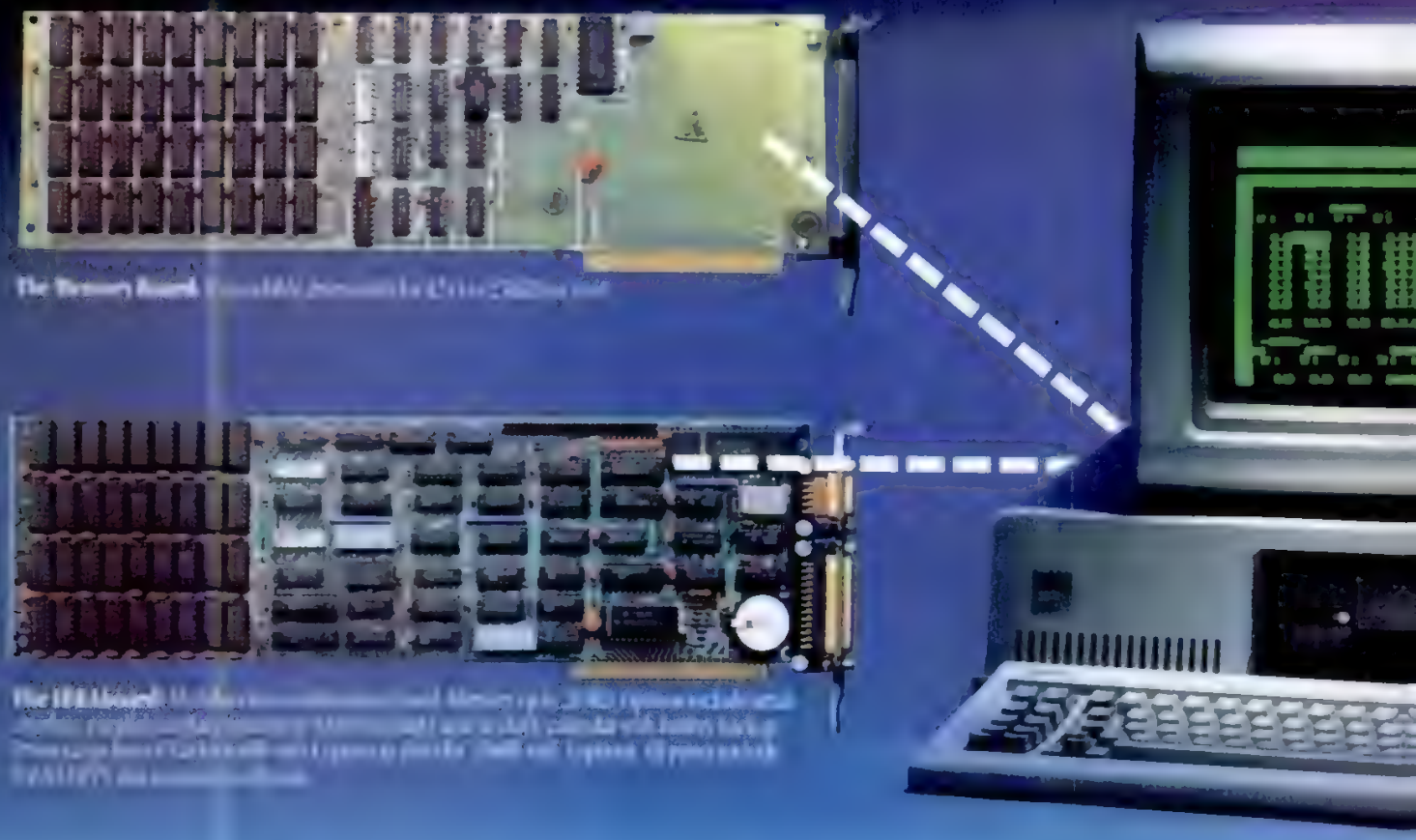
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All STB multi-function boards include a serial and parallel cable plus an external mounting bracket.
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We think the IBM Personal Computer is the best on the market. That's why we've concentrated our efforts on making add-ons strictly for the IBM PC.

We have ideas that can make your IBM PC even better. And more affordable.

Granted, those are ambitious goals. Goals that take quite a bit of imagination – and nerve – to reach.

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Better Idea No. 1: Innovative products.

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And remember: when you think of expanding your IBM PC, think of IDE first. We have five great ideas for you.

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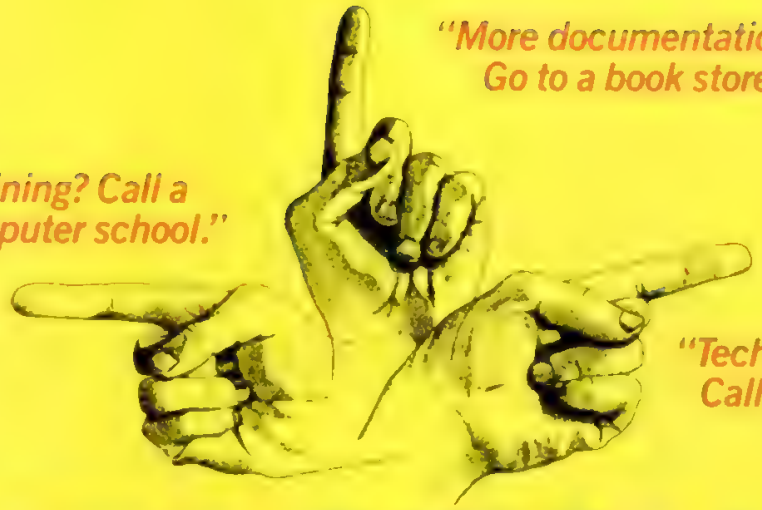
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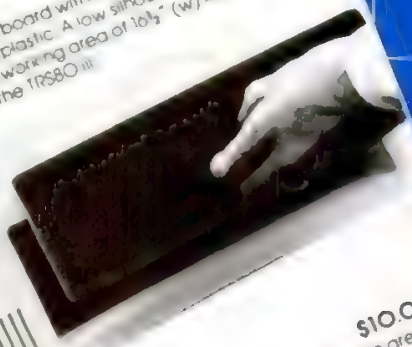
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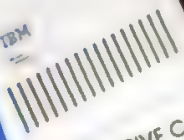
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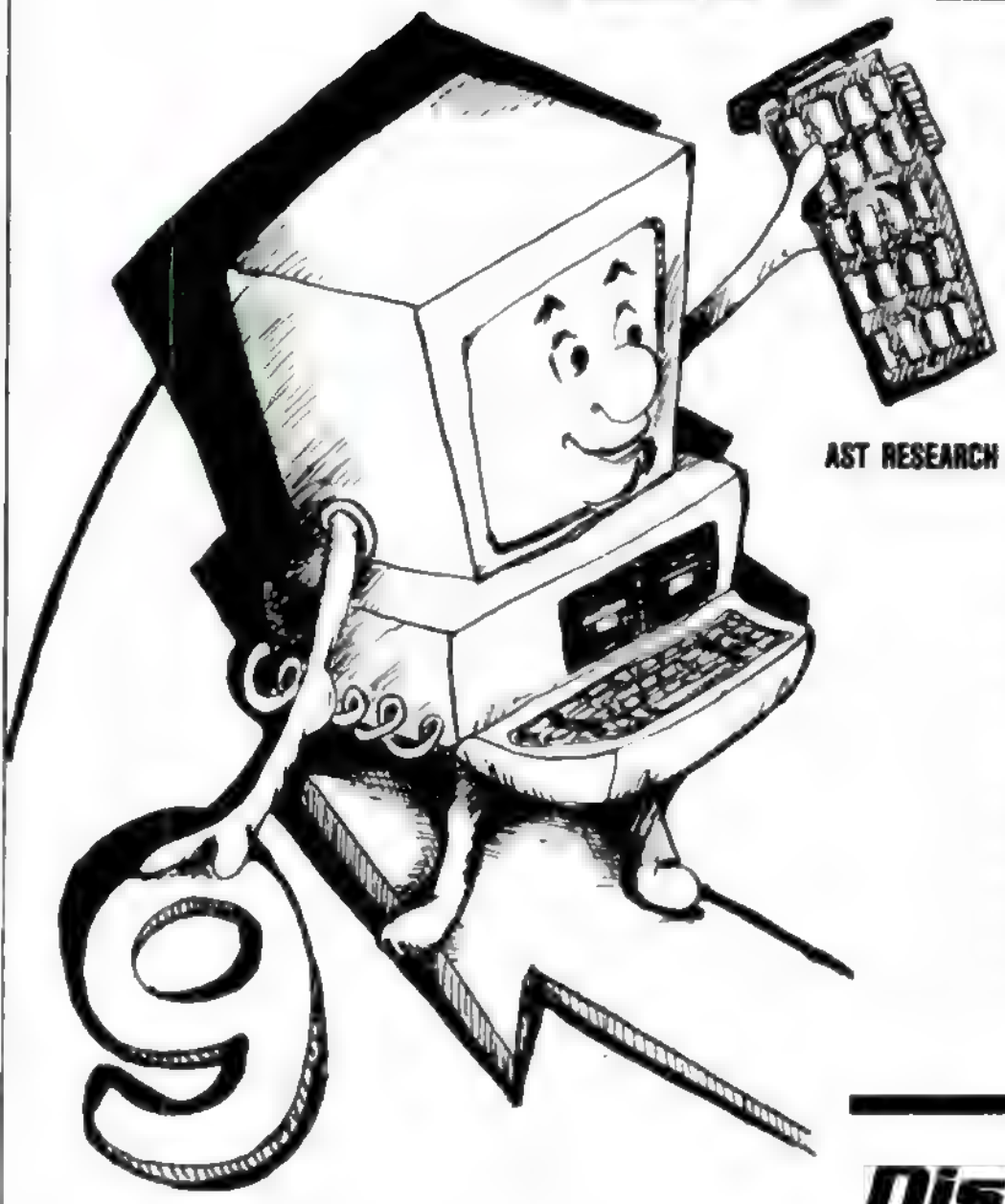
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About The Creator Of Databasezero

Michael Longacre, who traces his talent to his great-great-great-grandfather, the designer of the Indian head penny, is the architect of "Surreal Hotel," a monthly cartoon that appears in *Details* magazine. His prose and illustrations appear in the *Village Voice* regularly. Longacre's paintings and drawings hang in the Los Angeles County Museum of Fine Arts and the Dallas Museum of Fine Arts. His published writings include two articles on the history of the impact of bicycles on fashion, and he has served as art director of *Home Video* magazine and the *Soho Weekly News*.

Longacre, who was a starving artist for 10 years, has never been a longshoreman, elevator operator, or taxi driver. He is currently working on a parody of *Playboy* magazine (called *Playbore*), to be published this fall by the American Parody and Travesty Corp. He is also the part-time single parent of "someone fabulous" named Vanessa.

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Florian Binary thought he'd get modern and join the computer age. After all, he reasoned, it was time to move up from his digital watch (which he'd mastered two years earlier). A visit to his local "Computer Zone" store confused him a bit. The lone salesman, when asked if the computer in the window could balance a checkbook, looked up from his "Filpper Ball" game and answered, "Only if your floppy interfaces with your modem — but you need a mouse. Dos two?" Further questions elicited the same answer: "Five thou, Jack."

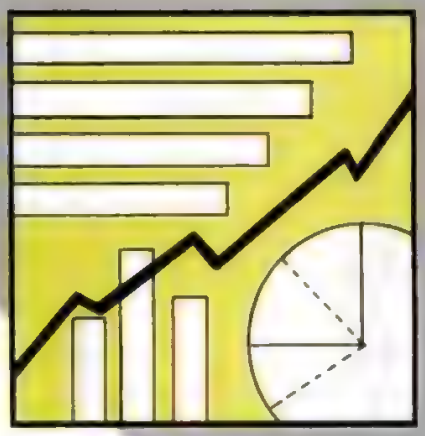
Attempting to digest this information later in the evening, Florian was delighted to notice a television commercial for "the Vegematicon III — a computer so powerful it never needs winding." The miracle of 800 dialing brought Florian into the computer age two days (and $149.99) later.

He's not sure if it's him or the Vegematicon, but so far he's only been able to make pie charts from his bank balance. Mrs. Binary, however, is thrilled with the "prompt order bonus gift," a combination ginsu knife and digital watch.

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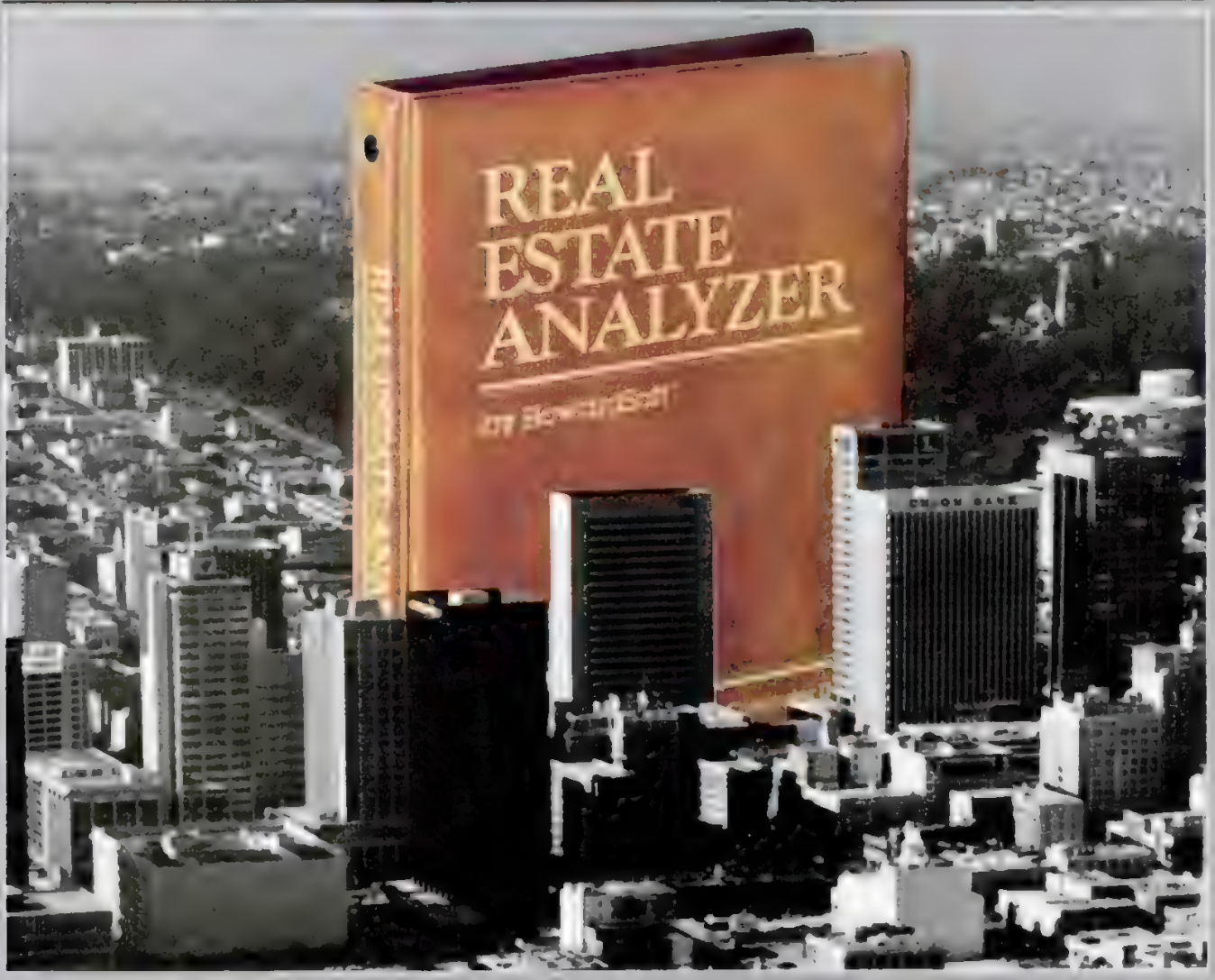
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The author decides to buy a computer. Quite unexpectedly, he receives a check for $5,000 from an unknown benefactor. There is only one stipulation on spending the money . . .

Beginner's Luck For The Computer Virgin

When Sarah saw John laughing with the tattooed man, it suddenly all made sense. John, the man she had fallen in love with, the man she wanted to marry, was also the man she had been risking her life to discover. John was the killer.

It was a decent ending to the mystery, which just needed a few more scenes where he threatens her, she escapes, and turns him in. And then the final chapter in which she learns to live with the heartbreak of having loved a man who turned out to be a ruthless, cold-blooded killer. I knew my book was nearly complete, and with a sense of accomplishment, idly flipped through the early pages. That's when the trouble started.

It didn't seem possible, but throughout the first six chapters, my heroine's name was "Sara." How in the world had she picked up an *h* at the end of her name for the last 200 pages? With a sense of foreboding, I began to read the earlier sections more carefully. The tattooed man had a bird-fish design on his left arm. Somehow it had migrated to his right arm by the time he threatened Sara (Sarah?) on page 178.

There was John, his blue eyes shining at her when they first met, his green eyes staring deeply into hers when they made love. My heroine may have been a great detective, but it was pretty evident that I, the author, had failed to notice some rather curious details.

MY COURSE was clear. It was time to buy a word processor.

With a sigh, I considered the options. No matter how I sliced it, it still came out to retyping over 280 pages. Even then I could only hope that typos, changes, new ideas, etc., wouldn't double that amount. My sense of accomplishment became a sense of frustration.

If I was going to spend all these hours in the future writing books, perhaps it was time to buy a word processor. But, how could I ever afford one?

Good morning, Mr. Kennedy. My name is Corey Sandler. I represent a very wealthy publishing company. I have here a cashier's check for $5,000 made out in your name.

You may use this money for any purpose you desire—as long as it's to purchase an IBM Personal Computer—on these conditions: You must never tell anyone (including your family, dealers, or salespeople) where you got the money, and you must agree never to try and discover the identity of your benefactor.

First of all, you should know that I have absolutely no affinity for either science or machinery, and computers seemed to me to be a diabolical amalgamation of both. In high school, I was always intimidated by the tall, awkward boy (there's one in every class) who could compute logarithms in seconds and who sneered at you when you asked him to teach you how to use the damned slide rule. Now that gawk is making a six figure salary in Silicon Valley, of course, while I try to convince bored publishers to look at yet one more manuscript featuring a courageous woman detective.

I HAVE absolutely no affinity for either science or machinery, and computers seemed to me to be a diabolical amalgamation of both.

It was only by convincing myself that I was just buying an elaborate arcade game with a typewriter attached that I could even consider how I'd actually deal with "computer people," all of whom I suspected of being former logarithm whiz kids. It was also necessary to admit to myself (and, eventually, them) that I knew next to nothing about these machines.

Welcome to ComputerLand

It may have been difficult for me to admit it, but it sure was easy for the sales people to accept my confession. "Nothing personal, but you're what we call 'Computer Illiterate,' " said the first salesman I spoke with. Nothing personal, indeed!

I would have told him off, but I was unsure of the language he spoke. I had figured enough of it out to know that his comment was not exactly user-friendly, but I had not yet decided if I was being insulted when he gave me a Donny Osmond smile and spoke of motherboards and ram capability. Besides that, I was so grateful for his attention that I was hardly in a position to insult him.

I had been in ComputerLand for 20 minutes before anyone even acknowledged my presence. The occasional salesperson who walked into the showroom would glance at me and, before I could smile, scurry into the back room. I didn't mind that much, though. The place was nicely carpeted, had loads of computers, and they played pleasant music, although I prefer the Beatles' version of "Michelle" to the one by Andre Kostelanetz.

At any rate, by the time Bob approached me to ask if I was being helped, I was so grateful for attention that I skipped the sarcasm and told him my story. He nodded knowingly as I told him about my writing career. Then without comment, he led me to a PC.

"Sit here and read what it tells you on the screen," he said. "It will teach you how to do everything." Then he left.

Of course it didn't, but I must admit that I was pretty pleased with myself for learning how to move the cursor before Bob returned. If he'd come back just a few moments later, I'm sure I would have mastered the fine art of inserting a word into a line. But Bob insisted on helping me. (I suspect he was a little surprised that I hadn't advanced beyond the cursor-moving stage already.)

I DECIDED it was time to shop elsewhere. I had in mind a store which hadn't already pegged me as an "illiterate."

Word by laborious word, Bob read me everything on the screen. It was humiliating enough to have this stranger assume that I could not read simple English—it was even more humiliating when I screwed up and pushed the wrong button. It seemed the computer and Bob exulted simultaneously in my stupidity. It was just about at this point that Bob told me—nothing personal, mind you—that I was an illiterate when it came to computers.

"If you had a couple hours," Bob assured me, "you could sit here and walk out an expert." He glanced at his watch. "Of course, you don't have a couple hours now, but when you get it home, you'll figure it out in no time."

Now, maybe I couldn't insert a word into a line, but I could tell that Bob was hoping against hope that I wouldn't have a couple of hours to sit and learn the program he was calling *Select*. I did have the time, but the thought of him reading every screen to me was enough to make me nod in agreement. Then I asked him if he could give me some literature so I would know what I was talking about when I came in again.

Bob looked around in vain for a spare copy of *PC*; instead, he handed me a book. "It's a little expensive," he said, reaching out to collect $10, "but the next time you come in, you should have a better idea what you want." Somehow, the way he thought a $10 book might be too expensive for someone shopping for a multi-thousand-dollar purchase made me wonder how seriously he took me. Regardless, I bought the book, read it, and decided it was time to shop elsewhere. I had in mind a store that hadn't already pegged me as an "illiterate."

The Missing Machine

I also had in mind a store where I wouldn't have to wait 20 minutes to flag down a salesman. However, to leave nothing to chance, I arrived at Entré 20 minutes before closing time. I may be a computer illiterate, but I know no salesperson wants to hang around through the dinner hour.

This time a young man with a wry smile listened to me. I thought I must be impressing him with my knowledge. "I want a PC with 64K, a matrix printer, and a word processing program," I said confidently.

"*WordStar*," he said matter of factly, and invited me into his office.

Now, to give Paul credit, it may have been the air of jaded knowledge I assumed, but I still cannot understand why he never showed me a computer for the entire 45 minutes we talked about them. He talked about *WordStar*, about mail merge, about all the things I as a writer could do with this program. What he never discussed was the computer and the printer, the $4,400 part of my $5,000 purchase.

I asked about it, of course. At the risk of losing my aura of knowledge, I even

resorted to asking what the thing looked like. He told me about the great training program his company included with the purchase price. I guess I was supposed to find out what it looked like then.

"The printer?" I asked, hoping I still might get a look at what he wanted me to buy. No such luck. He whipped a printed page off his desk and handed it to me. "This isn't done by the one you would want for your system, but it would look pretty much the same," he said. "Unless you wanted letter quality, but you said you didn't."

This presented a problem. I must have skipped the chapter on letter quality, because I had no idea what he was talking about. I may be vain, but I'm not stupid. I asked him to explain the difference. I got to look at another piece of paper, which really did look a lot nicer. That is, until he explained the difference in price to me. For several hundred dollars, I decided I could live with dots in my letters.

At any rate, Paul was soon writing out a price quotation for me. Everything was going smoothly until he asked if I wanted a service warranty that covered repairs in my home or if I wanted to bring the PC in. Sensing a last chance to handle the equipment, I asked how heavy it was. "Not too," he said, and wrote down my selection of the carry-in service warranty with no further discussion.

He then told me for the third time about the wonderful training program I would be enrolled in if I bought the PC from him. It all seemed a little like a car salesman promising to give you driving

I HAD walked into ComputerLand fully 20 minutes before anyone acknowledged my presence.

lessons if you shelled out the bucks to buy a car from him. But I decided not to haggle. After all, I had sat in front of one at ComputerLand, so I at least knew what it looked like. But, deep within me, I wondered why he wouldn't show me the merchandise. I was disappointed even though I knew I couldn't squeeze it like a melon to see if it was fresh. But as I said, I decided not to haggle. Twice he had told his manager, with only a trace of a sigh, that he would lock up the store, and I felt a little guilty about keeping him from dinner any longer just so I could see what my $5,000 would get me.

In Good Hands

I also felt that I was getting pretty close to deciding to forget all about buying a word processor. Why not spend the money on a professional typist instead? At 50 cents a page, I could write a lot of books before I'd pay out the price of a PC. One last shot, I decided. So on Saturday morning I rose early, drove to a local shopping center at nine, and waited for an hour for the Sears Business Center to open.

Evidently computer stores are not accustomed to having customers wait outside like so many crazed shoppers at Gimbel's pre-Christmas sale. The three salespeople looked at me with more than a little bemusement. To his credit, one hardy soul forsook his coffee-and-Danish and walked right up to me. Assuming no airs this time, I told him straight out, "I'm a writer, and I need a word processor."

I'll admit that Wico was my kind of salesperson. He was friendly, asked me all sorts of questions about my writing, and most importantly, didn't seem to have his act all together.

"Here, let me show you how the PC works," he said, and then spent more than 5 minutes putting in various disks and muttering something about boots. They didn't work. The screen just continued to give him a blank, green stare.

"Let's try another machine," he said at last as he explained why it wasn't the computer's fault that he couldn't make it work. I like that in a salesperson—the ability to take the blame when the $5,000 purchase you're contemplating won't even wink at you.

"The only difference between these two machines," he explained as we sat down at another machine, "is that this is a single-disk drive." The other difference was that it worked. I gathered he thought I should still buy the double-disk drive model.

"This is the *EasyWriter II*," he explained, as the machine greeted us, in a tone quite a bit friendlier than I'd heard from the salespeople at my other two stops. "I don't really know much about it, but I think it's what you want. Let's see if

IT HAD never occurred to me that these little machines could be used for this purpose.

we can get it to work for us."

Like Bob at ComputerLand, Wico read what was on the screen word for word. Unlike Bob, he was reading it for himself, and I liked that. I also liked the fact that I figured out how to work the program before Wico did. As I said, he was my kind of salesperson.

We fooled around with *EasyWriter II* for awhile, and it seemed to be doing the sort of things I wanted my word processing system to do, so I asked Wico for a price quote on everything he had recommended. Then something unusual happened. My computer salesman sat at a computer terminal to do the job.

It had never occurred to me that these little machines could be used for this purpose. After all, at ComputerLand I had been given a quotation written in pencil. At Entré, at least I got it in pen and ink, but there was no breakdown on any of the items—just a short list of Hardware, Software, and Warranty, followed by a Grand Total. But here at Sears I received a computer printout.

Not only that, but the printout showed me the price of every item, whether I was buying it or not; it even reminded Wico to give me a promotional discount. Without even knowing it, I had bargained down the system by $200, and the *EasyWriter II* was reduced by $175. And Sears threw in *Time Manager* for free.

"But, Wico, I don't want *Time Manager*," I said.

"You might as well take it," he answered. "It comes with the promotion."

I walked out of Sears feeling much better about the possibility of becoming a PC

owner. The price was pretty good. The salesperson had been nicer than I had come to expect, and together he and I had figured out that there was indeed a word processing program that would do just about everything I needed. It was time to make some decisions.

Sifting the Evidence

Everyone had agreed that I needed a PC with two disk drives. Bob at ComputerLand had recommended 128K on the motherboard; although I had no idea what this meant, the other two salespeople agreed when I mentioned it to them. All three had agreed that I needed a monochrome monitor, and all had been rather quick to recommend a dot-matrix printer over a letter-quality one. At least, they all seemed certain after I said I had no need for letter-quality printouts.

The big disagreements seemed to be over the brand of printer. At ComputerLand, Bob had vigorously pushed for an Epson printer. "Epson makes them for IBM," he had insisted, "and you might as well get all the quality for a lower price." "But I want an all-IBM system," I had told him. "Well, they're on back order," he finally admitted.

At Entré, there had never been any question of selling me any other printer than an IBM. Sears first quoted a price on an Okidata printer, but quickly switched to IBM when I voiced a preference to stay with the same name for the whole system.

Choosing the software, on the other hand, was a problem. Bob at ComputerLand had shown me *Select*, and then when I expressed doubts about whether that program did everything I needed, and sold me *The Word Processing Book* by Peter A McWilliams and told me to choose my own.

At Entré, Paul made *WordStar* sound like the right stuff for me. However, he hadn't even bothered to show it to me, and reading about it in McWilliams' book made me wonder if it wasn't a tad on the difficult side. Remember, I was still thinking of myself as a computer illiterate.

EasyWriter II had been fairly easy to follow; Wico and I worked together to master some of its greatest intricacies, like deleting and changing words. I felt a fondness for it. However, I had felt a fondness for my first wife, so I wasn't sure I should necessarily follow this instinct.

Instead, I did what any sensible person would do. I called up a friend and asked for help. My friend had owned his PC for over a year and continually proselytized for the system. He is also a writer; although he has prospered more than I, deep in his heart he must know it is not because he is a better writer, but because he has better equipment. I wondered if his advice would be any good.

His recommendations were to go with the IBM printer and the *EasyWriter II*. Against my better judgment, I followed his advice. Now that I knew exactly what I wanted, it was time to get it.

At this point it might help if you understood me a little better, if only to grasp what I demanded. The last time I bought a car, I put it off for as long as possible. I found every reason in the world not to spend that kind of money. When necessity finally prevailed, I spent 2 hours shopping and then demanded that my car be ready within a day. I mean, for me, that day was the culmination of months of deliberation, and I did not want to wait any longer for satisfaction.

I was somewhat proud of the fact that I had actually visited three different computer stores. I had only visited two car dealers before I made my auto purchase. But now that I had avoided facing the inevitability of buying a PC for over a year, I wanted it that day. I also figured that I would see, one last time, if I could drive down the price of the system.

SHE THINKS I'm into something illegal. I didn't want to disillusion her by admitting that I was buying a personal computer.

In the Land of the Cannibals

I dialed up Bob at ComputerLand for what I thought would be a quick call. I told him what I wanted, and he quoted a price that was better than Sears' by a few dollars. "You're in luck," he said. "We're just starting a national promotion, and we're giving you 10 percent of your system price off the purchase of software."

My idea of luck, however, was not necessarily the same as Bob's. "OK," I said, "will you be able to have everything ready for me if I come over later today?"

There was a pregnant pause on his end of the line. "Well, I told you the IBM printer was on back order and won't be in for a couple of days."

"That's OK," I said cheerily. "I can get the thing going without the printer and just add it on next week."

Another pause.

"Well, there's another problem," he added in slow, measured tones. "We don't have the CPU in stock today, either."

"What's a CPU, Bob?" I asked, figuring it was some little doodad you hooked up to the printer or something.

"Well," Bob said slowly, "that's kind of the guts of the computer."

Now even though I was a computer illiterate, I was fast enough to realize that what Bob really had to say was that he didn't have what I wanted in stock. I told him that since I wanted the system that day, I would go elsewhere.

"Well, listen," he said rather desperately, "maybe I have another unit around here I can cannibalize."

"Isn't that a little like putting Chevy engines in Oldsmobiles?"

"No, no," he assured me. "Nothing like it at all. Listen, give me your phone number and I'll call you right back if we can have this ready for you today."

I gave him my phone number, told him to call me back in an hour, and waited. And waited. After two-and-a-half hours, I called ComputerLand myself.

Bob wasn't in, but the woman who answered the phone was glad to hear my name when I told her who I was.

"Oh, Mr. Kennedy, I'm glad you called back. Bob lost your phone number, and he's out of the office now. But he said to tell you that he can have everything you want by tomorrow afternoon."

"I'm sorry," I told her, "but Sears has everything I need right now, so I'm going to go to them."

"But, Mr. Kennedy," she said somewhat indignantly, "we are a full service store."

"I know," I said, "but it's difficult to service what you don't have." I hung up and called Sears.

Making the Connection

Wico came to the phone, and I told him who I was. I also told him I wanted to buy the system he had quoted to me on Saturday. "Just a minute," Wico said, "and I'll get that quote out of my file." Knowing Wico as well as I had come to know him at our previous session, I was not surprised when he came back more than a few minutes later.

I WAS somewhat proud of the fact that I had actually visited three different computer stores.

"I have it here," he announced triumphantly.

"Good," I said. "Set the whole works aside for me. I'll be down later today to get it."

"Well, I don't know if we have everything in stock," he said, and I suddenly had visions of computer ration lines queueing up throughout the country. Odd license plates today, even tomorrow.

"But you told me Saturday you had everything!" I said, stopping just short of yelling.

"That was Saturday," he explained—a statement so eminently logical I could not argue. He put the phone down, came back in a few minutes, and told me all was well. He had just grabbed the last DOS 1.1, and everything would be ready if I came around 6 p.m.

I was so glad to know I could get it, I forgot to try and bargain with him further. I also decided not to call up Entré. To be truthful, I had known all along I wouldn't buy it there when I found no one would show me the system. The fact that its price quotation was over 10 percent higher was the other factor.

I went to the bank and wrote a check for $4,500. When the teller looked at me suspiciously, I told her I was going to the track. She seemed to accept the explanation. Especially, I gather, since she is the teller I visit nearly every other day to withdraw money. I know she thinks I'm into something illegal or, at any rate, immoral. I didn't want to disillusion her by admitting that (a) I just can't manage my money, and (b) I was buying a personal computer. So, with money in my pocket and a great desire to get the damned thing home at last, I went back to my office and waited for the afternoon to end.

No sooner had I walked in than the phone rang for me. It was Bob.

"Don," he said, "I can have your system ready by 11 tomorrow."

"I need it today," I told him.

"All right, I'll have it ready by 6 tonight," he said.

"Too late, Bob. I just asked Sears to set it aside for me. Besides, they were a little cheaper than your quote."

"I'll beat it," he said.

"You should have told me earlier."

"Listen," he said, sounding just the tiniest bit edgy, "Have you given them a deposit?"

"Bob, I gave them my word. I'm buying it from Sears."

"Well," Bob said, "just remember, ComputerLand is a full-service store." I promised I would remember that and hung up.

At 5 p.m. I left my office, struggled through rush hour on the Garden State and made it to Sears at 6 on the dot. Wico was with a customer, so I sat down, read the Sears extended warranty contract three times, and waited. Finally, he freed himself and came over to me.

"I still have to set your system up," he told me. "It will just take about half an hour. You can watch me if you'd like."

I chose not to, and sat at the table in the showroom. Fortunately, there was a nice salesperson in the room, and since she had no customers, she was able to make the hour-and-a-quarter pass quite quickly for me. At 7:15, Wico came out to announce proudly that he was ready to put my PC in the crate. He seemed like a kitten that had caught his first mouse. He would have laid it at my feet, but since this would have ruined his dental work, I had to follow him back to the workroom to see what he had done.

I HAD visions of computer ration lines queueing up throughout the country. Odd license plates today, even tomorrow.

Although it looked exactly like the system he had shown me a few days earlier, I expressed my admiration for his fine work and asked him to explain how I should set it up at home. I listened patiently as he explained that there was a book in the bottom of the crate that would unravel the mysteries of the PC for me.

BOB AT ComputerLand had recommended 128K on the motherboard; I had no idea what this meant.

"You mean I'm on my own?" I asked.

"You'll do well," he said. He had been so trustworthy last Saturday that I couldn't begin to doubt his faith in me now, even though I knew what he was saying could not possibly be true. Instead, I signed about four papers, gave him the money, got 20 cents change for the 45 hundred-dollar bills I had given him, drove the Datsun to the front of the building, and smiled as he put the boxes in the hatchback.

Home at Last

Today, 6 days later, those boxes are still sitting in my living room unopened. I'm thinking of opening them tomorrow night. Or maybe the next. It has suddenly hit me that my Adler manual is an antique and my Smith-Corona electric isn't far behind. Yet, we three have been through a lot together. Call me sentimental, but writers do have feelings for their machines. Now that the PC is sitting patiently in its boxes waiting for me, I feel a lot more comfortable about using it. I hope it understands that this story just had to be written on a typewriter. */PC*



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Bigger can indeed be better when you select a chain store as your computer dealer, especially if you plan to move or travel with your PC.

A Dealer In Every Port Whether You Travel Or Not

PC users, as a whole, are a dedicated bunch. Most of them have an intimate attachment to their machines. Some, in fact, can't bear to leave their computers behind when they go away from home.

But what happens when the well-traveled computer requires technical attention? One Washington D.C.-area PC owner recently suffered an equipment failure while on a trip to Massachusetts. He made an after-hours telephone call to the Cape Cod outlet of the franchise from which he'd purchased his ailing machine. The prompt attention he received helped him keep on schedule during his brief working vacation. The moral of the story: People who move or travel frequently can help provide an extra margin of security for themselves by buying from a multi-store operation, which is to say, a franchise.

The helpful dealer in Cape Cod was an Entré outlet but virtually all franchise networks and chains have some kind of arrangement for transferring service and support. The heavy capitalization behind many multi-store dealerships may also give them an edge over some independents in pricing, depth of support, product availability, and the likelihood of their being around for the long haul.

WHAT HAPPENS when the well-traveled computer requires technical attention?

Travel Assurance

Multi-store dealerships are not difficult to find. ComputerLand, the largest with its immense cross-country network and an international reach into Canada, Europe, and Japan, counts more than 400 outlets. Many other companies are expanding rapidly. Entré, for example, has 50 stores around the country and another 50 slated to open soon. Sears has 45 Business Systems Centers. IBM Product Centers number about 45 in this country and over two dozen overseas. MicroAge claims 30 outlets, more than half of which carry IBM PCs. Businessland, which has fewer than ten outlets now, expects to grow to a total of 21 stores in California, Arizona, and Texas by the end of the year. The Macy's outlets in New York and California, plus those in Macy's-affiliated Bamberger's in New Jersey and David-

son's in Atlanta, account for eight retail computer centers.

Actually, a majority of the nearly 800 authorized dealers listed in IBM's dealer directory are franchise and chain outlets. A very large number of what IBM calls "independents"—fourth on the list of its distribution channels—are actually multi-dealerships. Entré, MicroAge, Compu-Shop, Businessland, and Macy's stores fall into this category.

Whether it's through the MicroAge Promise or the ComputerLand Passport Program, most multi-store operations offer the promise of service and preferred-customer treatment and support to computer owners who spend a lot of time on the road or who move to other locations. If you find another outlet of the chain or franchise that sold you your machine, you've got the same claim on this dealer's attention that you'd have at the store where you made the initial purchase.

Although there are advantages for both business and home buyers, many of the major chains and franchises are heavily oriented to business users. Phil Reed, operations vice president at Businessland, sees a big advantage for large corporations in dealing with a multi-store dealer. "As the chain grows," he said, "we can establish corporate agreements with companies that have offices around the country. The company wouldn't have to deal with a lot of independents."

MANY OF THE major chains and franchises are most heavily oriented to business users.

Price and Quality Advantages

Aside from increased accessibility, are there other benefits from a multi-outlet store not so readily available from an independent? Dr. Harold Kinne, a senior vice president at Future Computing, a consulting and market research firm based in Texas, said, "We have not identified any substantial differences between franchises or chains and individual stores."

In regard to pricing, at least, many executives acknowledge this. Even with the potential advantages of volume buying, most multi-store dealerships are not competing with discounters.

However, most chains and franchises buy at least some of their product lines through a central purchasing office; individual stores in the network have considerable flexibility in setting prices. ComputerLand is in an especially good position to take advantage of large-scale buying, said its president, Ed Faber. "We can attract the highest margins available in the industry, and we can pass on the price breaks to each individual store owner."

Some multi-store operations may also have an advantage in product availability. If the item you want is out of stock at your local outlet, the dealer can often get it quickly from the central buying facility or

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Centralized product-quality evaluation is another benefit made possible by the standardization that chains and franchises impose on their outlets. Virtually all have some kind of testing program to examine as many as possible of the thousands of hardware and software products now appearing in the marketplace.

Most franchise and chain retailers require that a product meet certain standards before their outlets may carry it. Entré tests about 100 products every 10 days. Only about 1.5 percent of these are placed on the approved product list, said company marketing vice president and co-founder James Edgette. He added, "Franchisees don't have to carry everything on the approved list, but they can't sell anything that's not on it."

ComputerLand controls its store inventories by banishing products of inferior quality from its central-purchasing lists. Individual stores may choose to carry them, but in practice, said Faber, 80 to 90 percent of the total stock in each outlet comes from central purchasing. Chains exercise even more control than franchises. All Sears stores, for example, carry the same line of products.

Service and Support

The standards imposed by a chain or franchise (or by a conscientious independent dealer, for that matter) provide an extra measure of reassurance.

IBM IS IN A position to be as selective as it wants to be.

IBM's willingness to sell to a dealer signifies that the store has met rigorous standards in regard to technical competence, ability to provide backup and support, and financial standing.

The PC is IBM's first venture into retailing computers and the company is being very careful. It's very choosy in picking dealers, and not all the stores in a given franchise are guaranteed delivery of the PC—each one must meet IBM standards. And, having gone from zero to 20 percent of the personal-computer market in just a year, IBM is in a position to be as selective as it wants. There is room for flexibility; even IBM Product Center managers have a certain amount of latitude in pricing and product selection. PC dealers, however, must meet IBM's requirements on all phases of their operations: technical, financial and marketing. As one retailer said, "IBM can't be treated the way you would treat most computer companies."

Chain and franchise executives generally point to their heavy capitalization to highlight what sets them apart from most independent or single-store operations. This financial stability means they can afford to do more. Many multi-store operations give their salespeople extensive technical training in addition to the product training provided by the manufacturer and the standard sales and marketing ses-

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CIRCLE 364 ON READER SERVICE CARD

sions. They provide product and technology updates via regular newsletters and through in-store computer networks.

Franchises and individual chain outlets often run programs of classes for end users. The stores get considerable help from their central offices in setting up the sessions. MicroAge provides step-by-step instructions, ranging "from ordering the refreshments to how long to run the class before people get tired," said one of its executives, Charles Redfern.

The architectural requirements set by several chains and franchises often specify that classroom space be included in the store layout. This indicates a strong commitment to end-user education.

The Extra Margin of Security

The large-scale product testing, readily-transferable maintenance agreements, and in-depth service provided by chains and franchises are by-products of a kind of financial commitment that most individual stores can't afford to make. Vice-President Reed of Businessland pointed out that his company "can amortize expenses over several stores."

In a fast-changing field, buyers might feel more secure in knowing that the dealer they buy from will be around when they come back for support. Franchises are far less likely to fail than are individual stores. Commerce Department figures show that since 1971, less than 5 percent of franchises have been discontinued in any given year. That contrasts with Small Business Administration estimates that some 65 percent of all small business start-ups fail within 5 years. It's unlikely that Sears and Macy's will be going out of business any time soon.

Even though IBM's careful look into the financial capabilities of all its dealers is reassuring, an extra measure of assurance may be found by purchasing from a chain or franchise. Even if the particular store you bought from closes, the organization will still be around to help you. In a very rare case where one of its franchisees closed, ComputerLand made good on all outstanding orders, according to Faber. The company continued to work with the customers through its other franchisees.

Having a store in every port can be an advantage if you travel a lot. And knowing that a dealer will still be there when you need support is important whether you travel or not. */PC*

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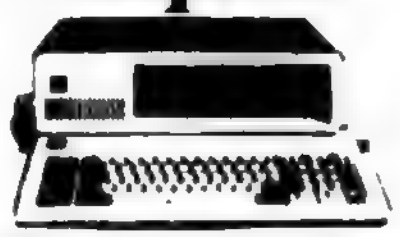
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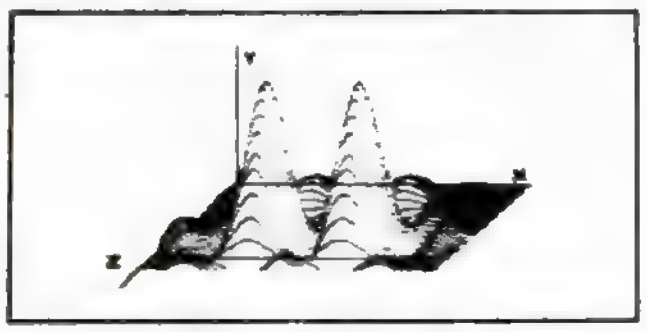
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GENERAL LEDGER: A complete accounting system with these features:

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- Interactive on-screen transaction journal
- Produces these reports:
  - Transactions Journal
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  - Account Ledgers
  - Account Listings
  - Income Statement

For APPLE II and IBM PC $150.00

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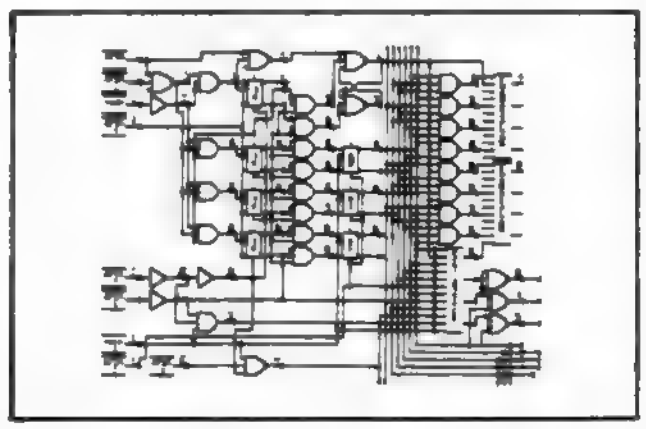
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- Prints invoices, customer statements & address labels.
- Interfaces to General Ledger.
- Interactive screen-based invoice work sheet.
- Produces these reports
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  - Sales Analysis
  - Account Listings
  - Customer Balances

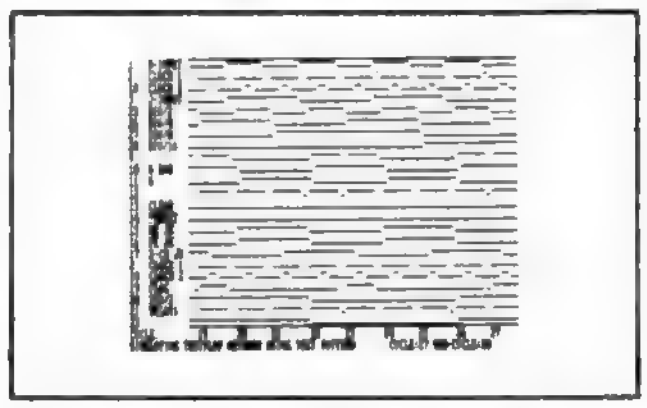
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Tne system provides on-screen editors for NETWORKS/MACROS DATA CHANNELS, CLOCK WAVEFORMS and GATES GATE attributes include DELAY, TRUTH TABLE, NAME and I/O clocking



The system is available for Apple II and IBM PC computers. A non-graphics version is available for CP/M 2 2 It uses the network editor to create netlists and text printer plots to display simulation results All versions require 2- 5 1/4" disk drives.

For APPLE II, IBM PC (192K) and CP/M (70K) $450 00
MANUAL & DEMO DISKETTE $50 00

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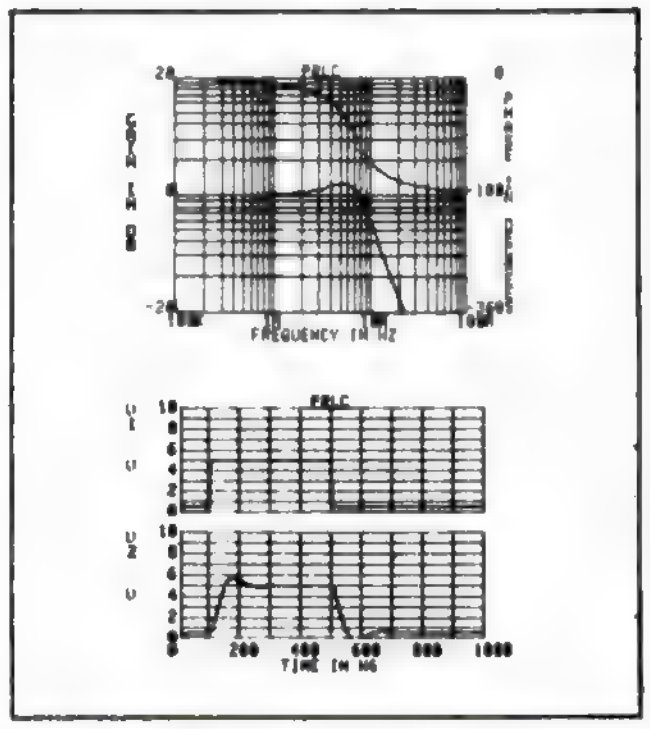
- Handles 25 Asset/Liability Accounts
- Monthly Transaction Reports
- Budgets Income & Expense
- Reconciles to Bank Statements
- Prints Checks & Mailing Labels
- Automatic Year-End Rollover
- Prepares a Net Worth Reports
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- User-Friendly Data Entry Forms
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- Extensive Error Trapping
- HI-RES Expense/Income Plots

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For APPLE II and IBM PC computers. A non-graphics version using an on-screen editor to enter networks and text printer plots to display simulation results is available for CP/M (2.2- 5 1/4" SSSD) systems Requires 2 disk drives.

For APPLE II, IBM PC (192K) and CP/M (70K) $475.00
MANUAL and DEMO DISKETTE $50 00

ORDERING INSTRUCTIONS: All programs are supplied on disk and run on Apple II (64K) or IBM PC (128K) with a single disk drive unless otherwise noted. Detailed instructions included. Orders are shipped within 5 days. Card users include card number. Add $2 50 postage and handling with each order. California residents add 6 1/2% sales tax. Foreign orders add $5.00 postage and handling per product.

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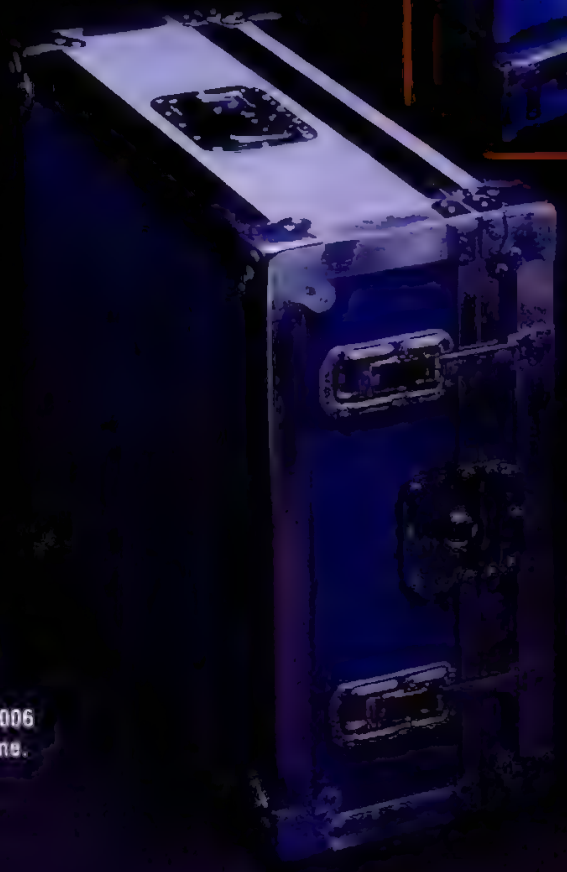
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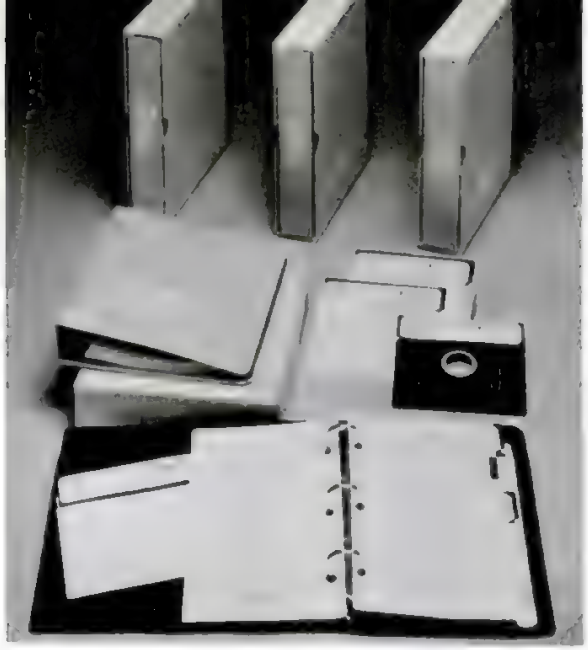
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Will Fastie Creative Computing, January 1983

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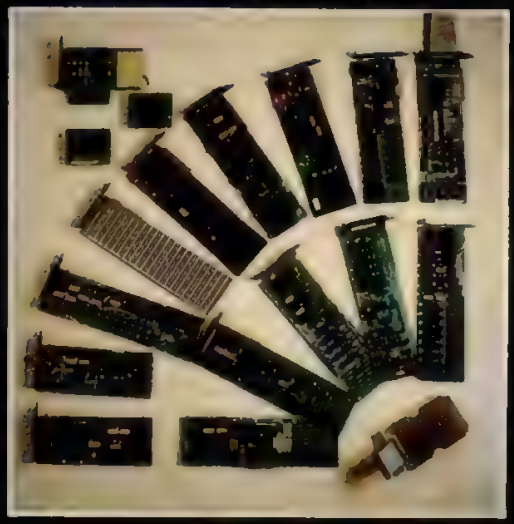
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Special thanks to Herman Miller, Inc., 600 Madison Ave., New York, NY for locations and furniture.

Selection of laboratory boards from Tecmar, including their Extender, Lab Master, Voice Synthesizer, Voice Recognition, Lab Tender, Graphics Master, Prototype, E+EEPROM, Video Van Gogh, IEEE/488, RAM/ROM, Stepper Motor Controller, DADIO, Base Board, Distance Tender, and Amoeba cards.



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In The Lab

The Ultimate IBM

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Whether he's counting quarks or conquering the common cold, this scientist's greatest discovery is the ease with which his PC lab system lets him store and analyze data. Built around Tecmar's formidable line of industrial and scientific peripherals, his system can store over 30 megabytes of information in twin Tecmar expansion chassis, each sporting a 15 MB Winchester. His PC also boasts a removable cartridge Winchester for backing up important files.

When he wants to crunch coefficients on a nearby mainframe, he dumps data onto an IDT half-inch tape drive. Here this unit is also serving as a stand for Tecmar's Shared Device Controller, and its Lab Master—a device containing from 8 to 256 channels for analog-to-digital conversion. Resting on the good doctor's PC is a 2-pen 7470A plotter from Hewlett Packard that he uses to record screens from his 12-inch Sony Profeel RGB monitor above. Rounding out his external hardware are a USI optical mouse for data input and editing, and an Epson dot matrix printer.

Inside the PC and the two expansion chassis are a welter of add-on boards, led by an IEEE488 Interface to allow access to the General Purpose Interface Bus (GPIB); a Lab Tender for data acquisition; a DADIO, with four independent digital-to-analog conversion channels; a Base Board with Opto-isolation input, output, and prototyping daughter module boards; an E+EEPROM Programmer/Reader for programming ultraviolet- and electrically-erasable ROM chips; and an E+EEPROM Expansion to yield a total 192K of programmable memory.

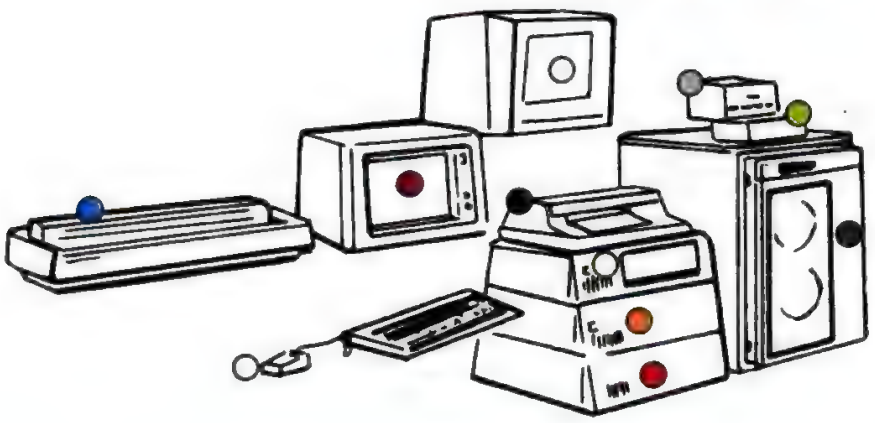
Also included are a Stepper Motor Controller for running four-phase or pulse-actuated motors; a Static RAM/ROM Board for developing programs in RAM then running them out of ROM; a ForgetMeNot CMOS (nonvolatile) memory with a battery backup; an Extender Card to allow repair, modification, and analysis of printer circuit boards; a Graphics Master to produce high-resolution color and monochrome graphics; and a Protozoa wire-wrap prototyping board.

Finally, for hands-free operation during critical experiments, he uses a Tecmar Voice Recognition board that can respond to 200 commands, and a Speech Master to produce voice-synthesized replies.

The modern, modular furniture is from Herman Miller's Co/Struc line of industrial and scientific products.

FOR HANDS-FREE OPERATION DURING EXPERIMENTS, HE USES A TECMAR VOICE RECOGNITION BOARD THAT RESPONDS TO 200 COMMANDS.

IN THE LAB



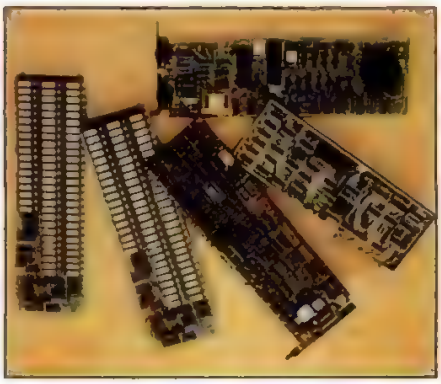
- IBM-compatible half-inch tape drive—Innovative Data Technology
- Lab Master—Tecmar
- Shared device controller—Tecmar
- Expansion chassis with 15-megabyte hard disk—Tecmar
- Expansion chassis with 10-megabyte hard disk—Tecmar
- IBM PC with Tecmar removable 5-megabyte cartridge Winchester
- 7470A plotter—Hewlett Packard
- 12-inch Profeel RGB monitor—Sony
- IBM monochrome monitor
- Mouse—USI
- MX-100 dot matrix printer—Epson

This attorney, who specializes in literary and theatrical clients, makes her important points with help from the PC. Her Vista quad-density floppy disk packs can function both as backups for the 20 megabytes of hard disk storage or as archival storage for infrequently used data.

Her system also drives an automatic 3M microfilm reader for efficient retrieval of archival files and legal citings. She can bang out drafts of her research, correspondence, and proposals on a Datasouth dot matrix 220 cps printer with high-speed and near-letter-quality output. She also has a NEC 3550 letter quality printer (connected to a Microbuffer from Practical Peripherals) available when she draws up a million-dollar contract.

The Gould uninterruptible power supply will keep her system alive long enough to save important files even during a typical New York blackout. Micro General PC Weighmate assists her in mailing thick proposals and manuscripts all over the country, while keeping postage bills pared to the bone.

Look inside her unit and you'll find two half-meg memory boards from Tall Tree Systems to facilitate cross-indexing and sorting of depositions and other trial documents. A Hayes 1200B modem on a board allows her to send and receive drafts of contracts and other documents from personal computers on the premises of her illustrious clients. She also uses an IRMA 3278-2 terminal emulator when she wants to call up royalty statements from mainframes at large publishing houses and studios.



Expansion boards for this counselor include two half-megabyte memory boards from Tall Tree Systems, a 3278-2 IRMA terminal from TAC, a Baby Blue, and a Hayes 1200B SmartModem card.

Her PC remains turned on late at night while her bookish assistant searches through off-premises law databases for legal precedents.

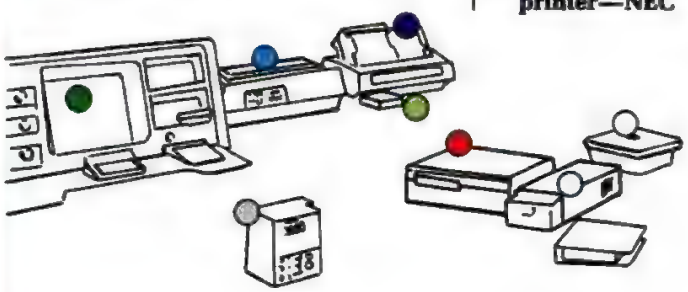
By assembling sections of different contracts on a series of hierarchical menus, she can turn files of boilerplate text into an ironclad contract with a few simple keystrokes. Billing and royalty statements are calculated automatically, and can be transmitted to many clients and accounts over the phone lines.

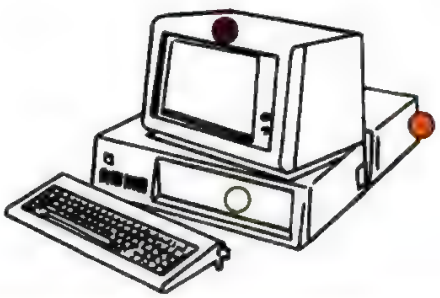
If you want to try to get her to give up her hard-working PC system, you've got a case. */PC*

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- **DS-220 dot matrix printer—Datasouth**
- **Uninterruptable power supply—Gould**
- **598 AGS microfilm reader—3M**







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AN ARTIST'S MODEL

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This graphic artist can afford to be image-conscious with his picture-perfect PC. He uses his system to create images, manipulate them, store them, and print them out in a variety of ways.

He generally draws his initial images using a stylus and his SAC sonic digitizer, mounted conveniently in the corner of his drafting table. Lately, however, he's been experimenting with video digitizer boards like the one made by Tecmar, and an inexpensive RCA black-and-white television camera that let him take a video snapshot of an image he's already created on paper, and turn it into a two-dimensional array of pixels that can be manipulated electronically.

He can also create images using his FTG and Symtec light pens directly on the screen, or with his Summagraphics bit pad. The light pens are handy for moving lines and doing general editing work. But he's found that using them continuously can be very tiring, since his arm is unsupported when he draws on the vertical surface of the screen. He occasionally tries using his Wico trackball and a succession of joysticks, but these don't allow the precise movements he needs, and are good only for rough sketches and edits.

He likes to use his Logitech mechanical mouse, which offers very high resolution and ease of use. His arm never gets tired as it does with light pens, and the three keys on the mouse can be programmed to draw lines, erase them, or paint-in areas. The mouse doesn't need much space on the desk, and lets him produce a wide range of lines, from tight, precise sketches to large sweeping arcs.

His 25-inch Sony Profeel RGB monitor has one of the most impressive CRT screens on the market, and certainly the largest. It can handle analog, digital, and NTSC inputs, but it does need a special converter to handle the IBM. Its colors come closer than anyone else's to the deep, saturated ones found only on IBM's color monitor.

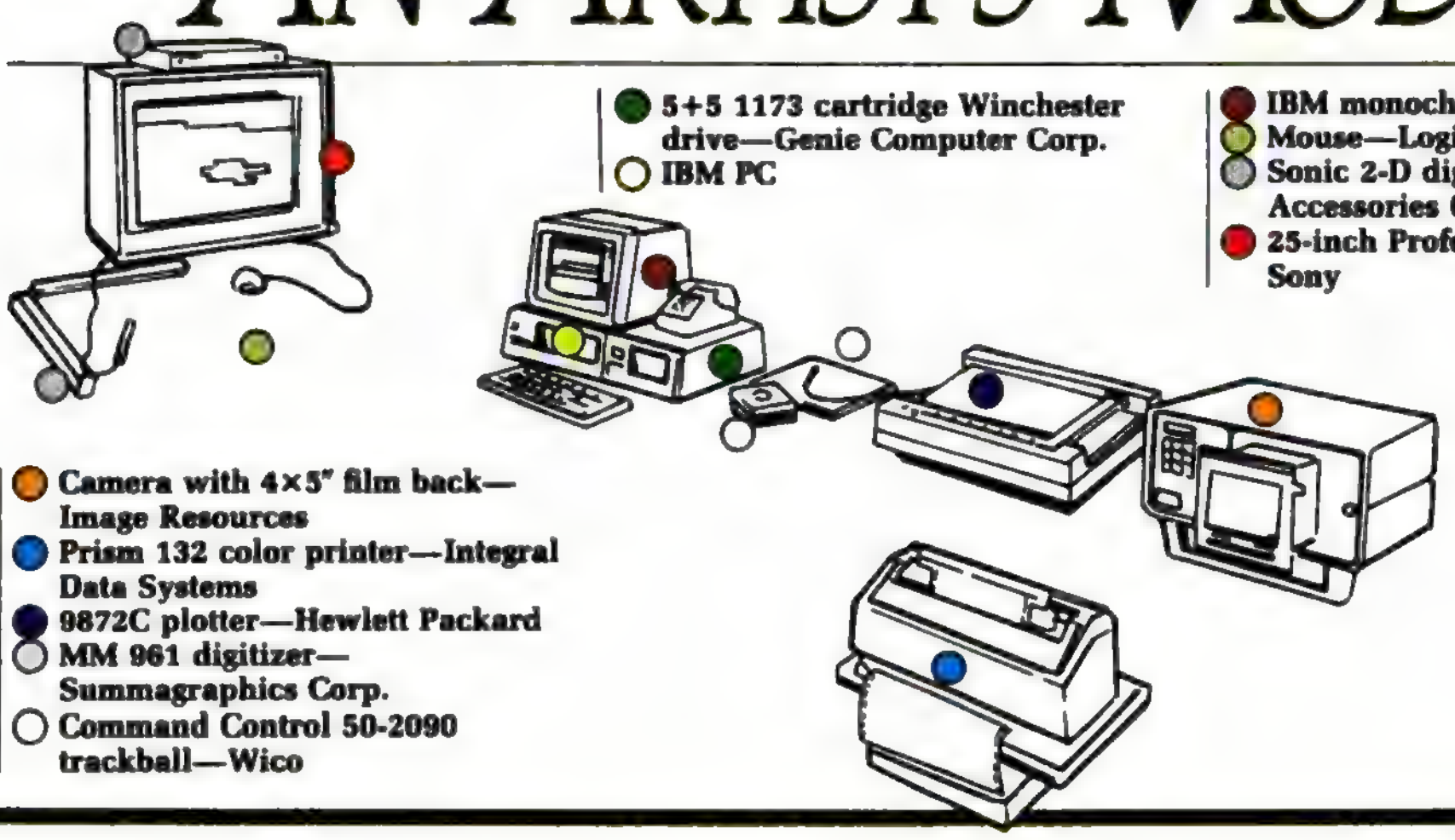
And he can capture any image from his screen on his Image Resources Videoprint 5000 camera, which lets him choose between a 35mm and a 4- by 5-inch film back. When he needs ultra-high resolution, he uses the firm's other PC, with its Control Systems Artist 1 analog graphics card (that can produce a 1,024 by 1,024 pixel image), and a Dunn 635 CompactColor Camera.

If he wants to transfer a screen image to paper, he can dump the image to his IDS Prism color printer, which can overlay four basic colors and produce fairly recognizable screen representations. He also uses his 8-pen Hewlett Packard 9872C plotter to reproduce images with many fine lines precisely.

Under the hood are a Sritek 68000 co-processor chip for rapid image processing, along with an I/O controller for Ziatech. His rich-looking furniture is part of Herman Miller's Action Office Products line. Chickens and goggles courtesy FAO Schwarz.

HE CAN CAPTURE ANY IMAGE FROM HIS SCREEN ON HIS IMAGE RESOURCES VIDEOPRINT 5000 CAMERA.

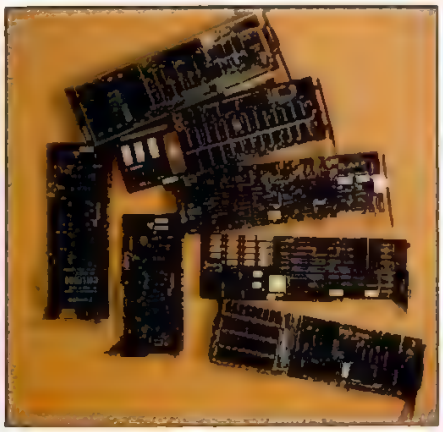
AN ARTIST'S MODEL



This rising midwest corporate executive's star has become far brighter since he hooked a PC up to his IBM 3278 terminal. Now he can draw raw data from the company mainframe and analyze it quickly and effectively with his fully-equipped PC. And he can salt away everything from intermediate results to detailed corporate histories on his handy 10 MB Corona hard disk, and pull it all up to his monitor at the touch of a key.

His special area of expertise is in charting commodities trends, and the PC serves him admirably. The impressive graphics it lets him produce have dazzled top company executives.

After adding the finishing touches to the graphs on his IBM color monitor, he can store the images on a disk so that they can either be transmitted over his Hayes 1200 Smartmodem to the Electrohome ECP 1000 7-foot laser-aligned dichroics projection system in the chairman's suite, or routed to the smaller TSK/Taxan 50-inch RGB projection unit in the corner of his own office. Or he can photograph them with his compact Celtic camera, or send the images to his top-of-the-line IBM XY/749 8-pen plotter. And for quick printouts, he can always dump the screen to his handy Graftrax-equipped IBM dot matrix printer.



Selection of add-on cards for the savvy MBA include a Byad board, and five boards from AST, including an I/O, Megaplus, PCnet, modem, and 80186 board.

His system unit and expansion chassis are packed with an 8087 chip for complex calculations, a Byad board for running CP/M software, and five boards from AST: a backup modem, a PCnet networking board, a Megaplus combination board stuffed with 512K, and an 80186 board for the special software that can handle it. He's even dabbled in enough programming to turn his PC into the most powerful full-function progammable calculator on the Loop.

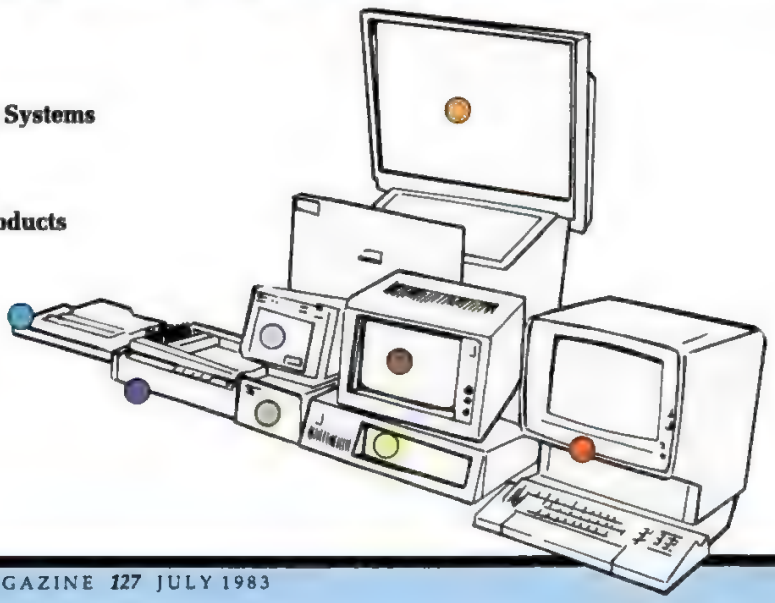
And, on his own time, he's become Wall Street-wise ever since he started tracking blue chips on his microchips; his own portfolio has increased so substantially that he's ordered an additional PC system for an office in his new Lake Shore Drive apartment. Each of his systems can be operated from the other, using the new Hayes communication package.

The strikingly contemporary office furniture was designed by Bruce Burdick, of the Burdick Group, for Herman Miller.

HIS SPECIAL AREA OF EXPERTISE IS IN CHARTING COMMODITIES TRENDS, AND THE PC SERVES HIM ADMIRABLY.

CORPORATE IMAGES

- **IBM 3278**
- **IBM PC**
- **IBM color monitor**
- **EX PHD 10-megabyte hard disk—Corona Data Systems**
- **VFR 2000 Camera—Celtic Technology**
- **XY/749 plotter—IBM Instruments Division**
- **IBM dot matrix printer**
- **SmartModem 1200—Hayes Microcomputer Products**
- **50″ RGB projection screen—TSK/Taxan**









CORPORATE IMAGES

THE ULTIMATE IBM

Approved material



A Word's Eye View

The Ultimate IBM

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Copyrighted material

This swank triple workstation is the last word in text-processing, from its three nimble PCs all sharing its blazingly quick Xerox 2700 laser printer, to its bit-mapped, macro-reliant software. In between are system units especially configured with large doses of memory that include track caching and electronic drive software for expeditious handling of letters, contracts, and proposals.

The various workstations are customized for specific applications. One uses an alternate keyboard from Keytronic with an improved key layout and shift-indicator lights for the typist who prefers a silent, soft touch. Another is connected to a Genius full-page display from Micro Display Systems, for documents that have special page positioning requirements. The third uses an Amdek amber screen for extra readability and an optical mouse from Mouse Systems Corp. for speedy editing. And all three stations are equipped with text buffers to prevent them from being put on hold by a busy printer or network line.

The Xerox 2700 Distributed Electronic Printer can spew out up to 12 pages—or 600 lines—per minute, using an internal laser, and hooks up to the PC over a standard Centronics 100 parallel interface. But when a proposal or a contract has to be letter-perfect, the printer of choice is their NEC 7730 Spinwriter. And when this impact printer is busy, the typists can send their text to Diablo 630 with sophisticated forms handling devices in another linked office.

These workstations are three nodes on a larger Ethernet network connected by 3-Com networking boards. This way, text can be shuttled to any of the three workstations, or to those in another part of the building. All the workstations can use the system's various printers, as well as its banks of Davong hard disks. Form letters can be prepared with fill-in names and addresses at ultra-high speed from databases on the Winchesters. Large word processing jobs can be divided up among several workstations and then combined as they are completed.

One of the units also functions as a Telex, routing important cables, orders, and directives to and from branch offices around the world. It keeps track of all electronic mail sent inside the office, and can digitize, store, and transmit spoken messages for callers with the proper access codes.

The company has installed several of the new flat-panel screens, which can put the equivalent of four separate conventional CRT screens on a single new plasma display. The image is nonreflective, flicker-free, and undistorted by the curved edges characteristic of most monitors currently in use.

The comfortable, yet practical seats are Herman Miller's highly-praised Ergon chairs.

THE VARIOUS WORKSTATIONS ARE CUSTOMIZED FOR SPECIFIC APPLICATIONS.

WORD'S EYE VIEW

- **IBM PC**
- **Alternate IBM keyboard—Keytronic Corp.**
- **IBM PC**
- **Pipeline buffer—Interactive Structures Inc.**
- **7730 Spinwriter letter quality printer—NEC**
- **IBM PC**
- **IBM monochrome monitor**
- **Microfazer buffer—Quadram Corp.**
- **Mouse—Mouse Systems Corp.**
- **Xerox 2700 laser printer**



The new COMPAQ Portable Computer. IBM compatibility to go.

Simple, isn't it? The COMPAQ™ Portable Computer can do what the IBM® Personal Computer does. To go.

It runs all the popular programs written for the IBM. It works with the same printers and other peripherals. It even accepts the same optional expansion electronics that give it additional capabilities and functionality.

There's really only one big difference. The COMPAQ Computer is designed to travel.

Carry the COMPAQ Computer from office to office. Carry it home on the weekend. Or take it on business trips.

If you're a consultant, take it to your client's office.

If you use a portable typewriter, you can use the COMPAQ Computer as a portable word processor instead.

If your company already uses the IBM Personal Computer, add the COMPAQ Portable as a mobile unit that can use the same programs, the same data disks, and even the same user manuals.

There are more programs available for the COMPAQ Computer than for any other portable. More, in fact, than for most nonportables. You can buy them in hundreds of computer stores nationwide, and they run as is, right off the shelf.

With most other portables you'd probably need to buy an additional display screen because the built-in screen is too small for certain tasks, like word processing. The COMPAQ Computer's display screen is nine inches diagonally, big enough for any job, and it shows a full 80 characters across. And the built-in display offers high-resolution graphics and text characters on the same screen.

The bottom line is this. The COMPAQ Computer is the first uncompromising portable computer. It delivers all the advantages of portability without trading off any computing power capability. And what do those advantages cost?

Nothing.

The COMPAQ Portable sells for hundreds less than a comparably equipped IBM or APPLE® III. Standard features include 128K bytes of internal memory and a 320K-byte disk drive, both of which are extra-cost options on the IBM. Memory and additional disk drive upgrades are available options to double those capacities.

In the standard configuration, the COMPAQ Computer has three open slots for functional expansion electronics as your needs and applications grow. It accepts standard network and communications interfaces including ETHERNET™ and OMNINET™.

If you're considering a personal computer, there's a new question you need to ask yourself. Why buy a computer that isn't portable?

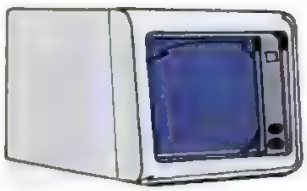
For more information on the COMPAQ Portable Computer and the location of the Authorized Dealer nearest you, write us. COMPAQ Computer Corporation, 20333 FM149, Houston, Texas 77070. Or call 1-800-231-9966.

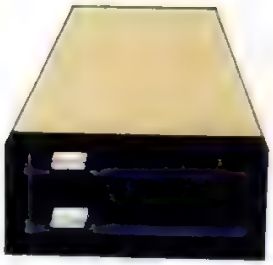
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PORTABLE COMPUTER
The most computer you can carry

CIRCLE 187 ON READER SERVICE CARD





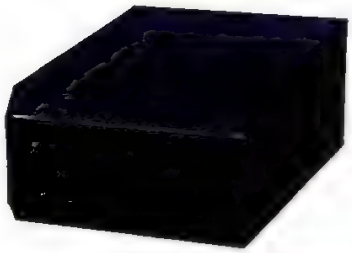


Image Camera

Composite Color Monitor

RF Modulator

RGB Color Monitor

Monochrome Monitor

Monochrome/ Parallel Printer Adapter Card

Light Pen

Color Graphics Adapter Card



High-Resolution Analog Monitor

Analog Color Graphics Adapter Card

Flat Panel Display

Flat Panel Controller Card

Hard-Disk Drive with Tape Backup

Cartridge Hard-Disk Drive

Fixed Hard-Disk Drive

Hard Disk Controller Card

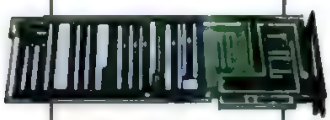
8" Floppy Disk Drive

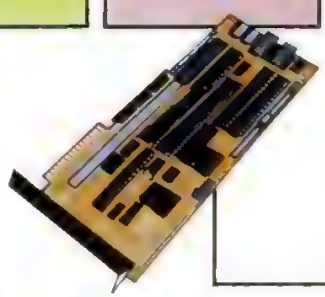
5¼" Floppy Disk Drive

5¼" Half-Height Floppy Disk Drive

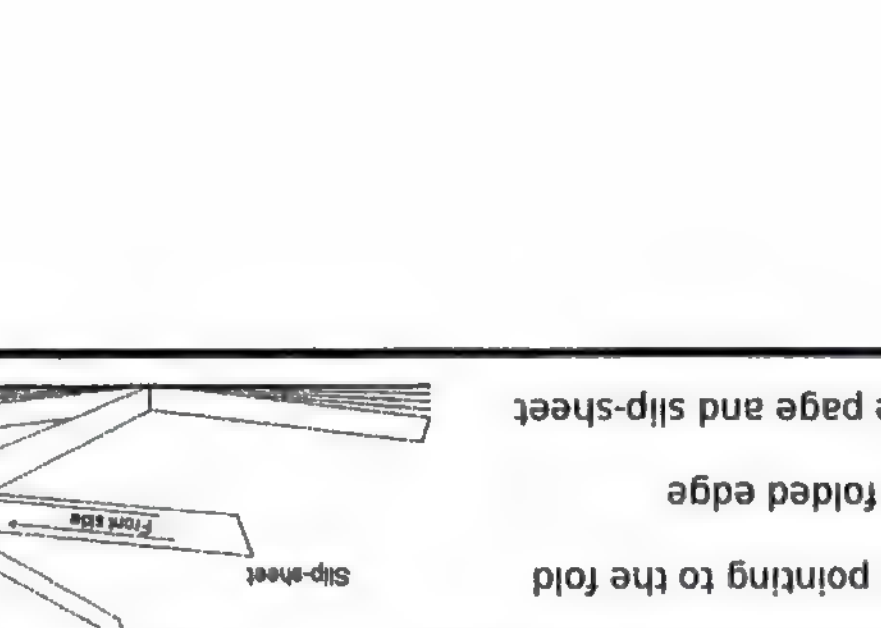
4" Mini-Floppy Disk Drive

Floppy Disk Controller Card



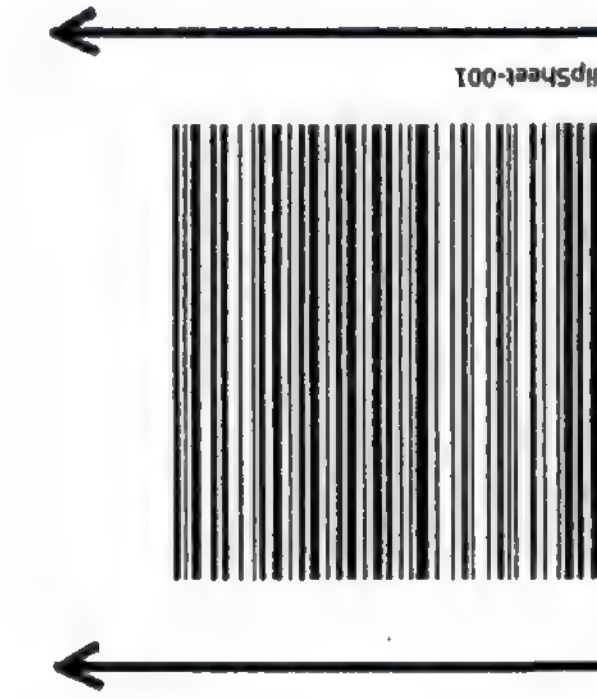


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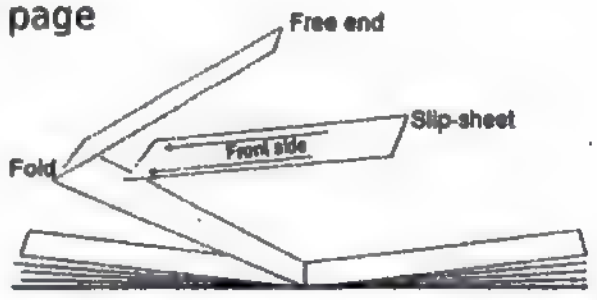
Foldout slip-sheet

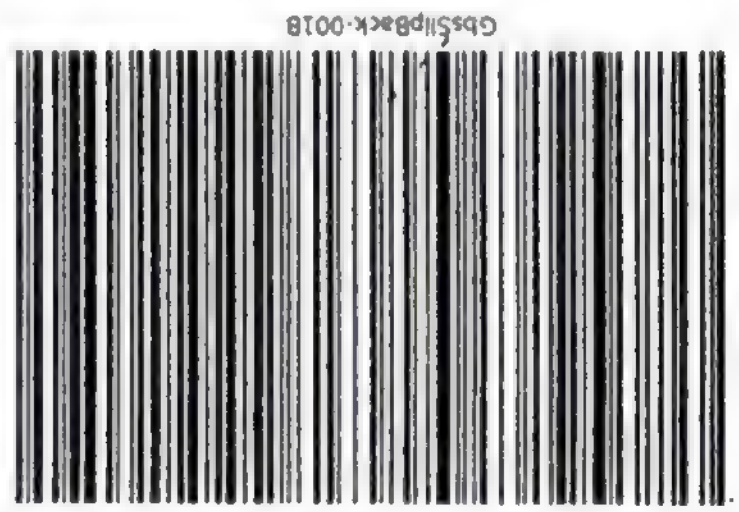
1. Open the foldout page
2. Insert this sheet with
    1. Front side touching the free page
    2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
    1. Front side touching the free page
    2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



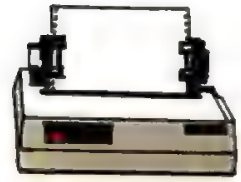


Back

1. Follow instructions on the other side

Inverted Back

1. Follow instructions on the other side



Printer Forms Handler

Jet Ink Printer

Laser Printer

Letter-Quality Printer

Color Dot Matrix Printer

Dot Matrix Printer

Printer Buffer/ Spooler

Parallel Output Card

OUTPUT DEVICES

Plotter

Serial Printer

Voice Synthesis Card

Videodisk And VCR Device

Robot Arm

Typewriter Interface

External Device Controller



INPUT DEVICES

Mouse

Voice Recognition Card

Bit Pad

Touch Screen

Touch Pad

Joystick

Optical Character Reader



Prototyping Card

Bus Extender Card



Networking Board

Serial/ Multifunction Card

External Modem

Card Modem

Expansion Chassis

YOU CAN NOW BUY PERIPHERALS THAT LEAN ON YOUR 8088 TO DO EVERYTHING FROM TURNING ON YOUR COFFEEPOT IN THE MORNING TO WEIGHING YOUR MAIL TO DIALING YOUR BOOKIE.

PC MAGAZINE'S CONFIGURATOR

By some accounts, IBM is moving 35,000 PCs every month. That's 50 every hour of every day, almost one new user a minute. Production lines may be slow in Detroit, but the IBM elves are hammering out PCs around the clock. And who knows what other product assembly lines Boca is cranking up?

We can't confirm these figures, of course. The folks in Boca Raton enforce their brand of *omertà* with such tightly closed mouths that they wouldn't admit they smelled smoke if their pants were on fire. But they're not entirely unjustified in maintaining the stony silence: They're carrying an entire industry on their billion-dollar coattails.

Today, there is a vast groaning board of IBM-compatible peripherals and software. Each month PC tantalizes readers with the wares of over 1,000 advertisers, from megalithic vendors to vest-pocket companies where the kitchen table doubles as a front desk.

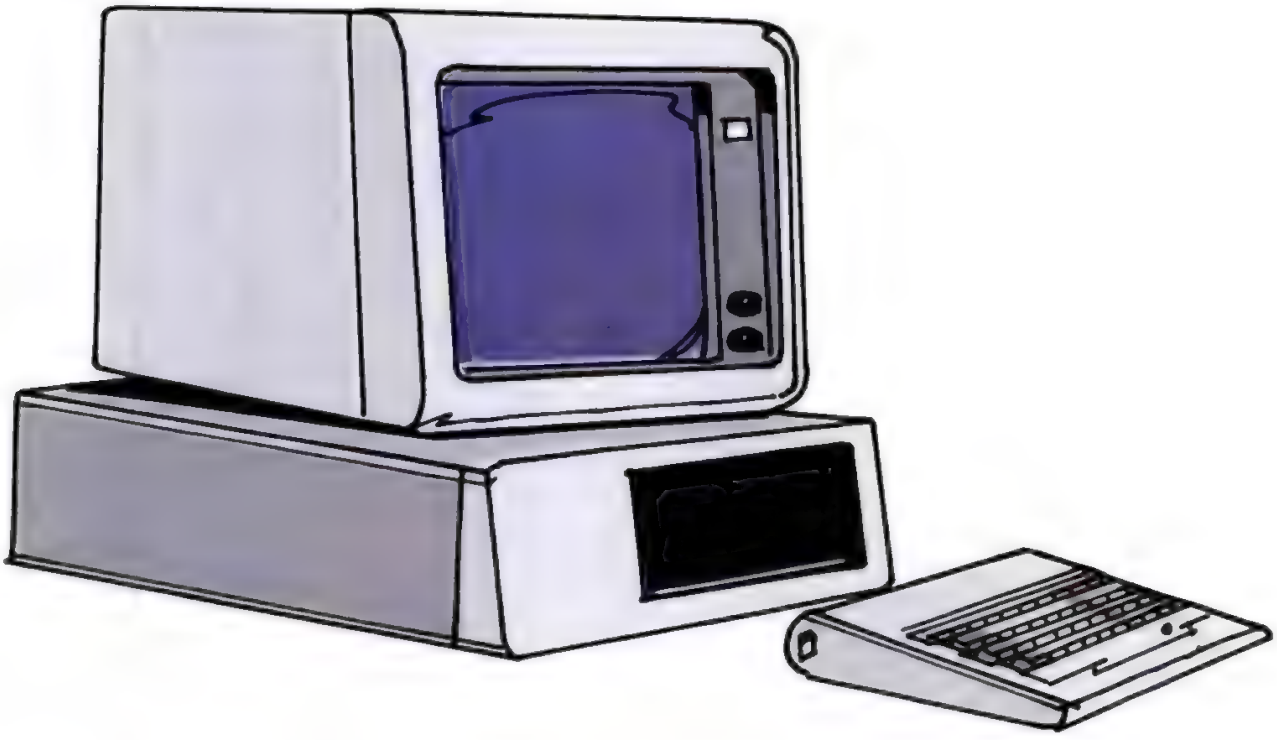
The PC is a well-made collection of other people's best products, and there's not much wrong with it. Or is there? Ever since the first one hit the shelves there's been such a ruckus about the keyboard that you'd think IBM ought to just call them all back and push them into a pit with bulldozers.

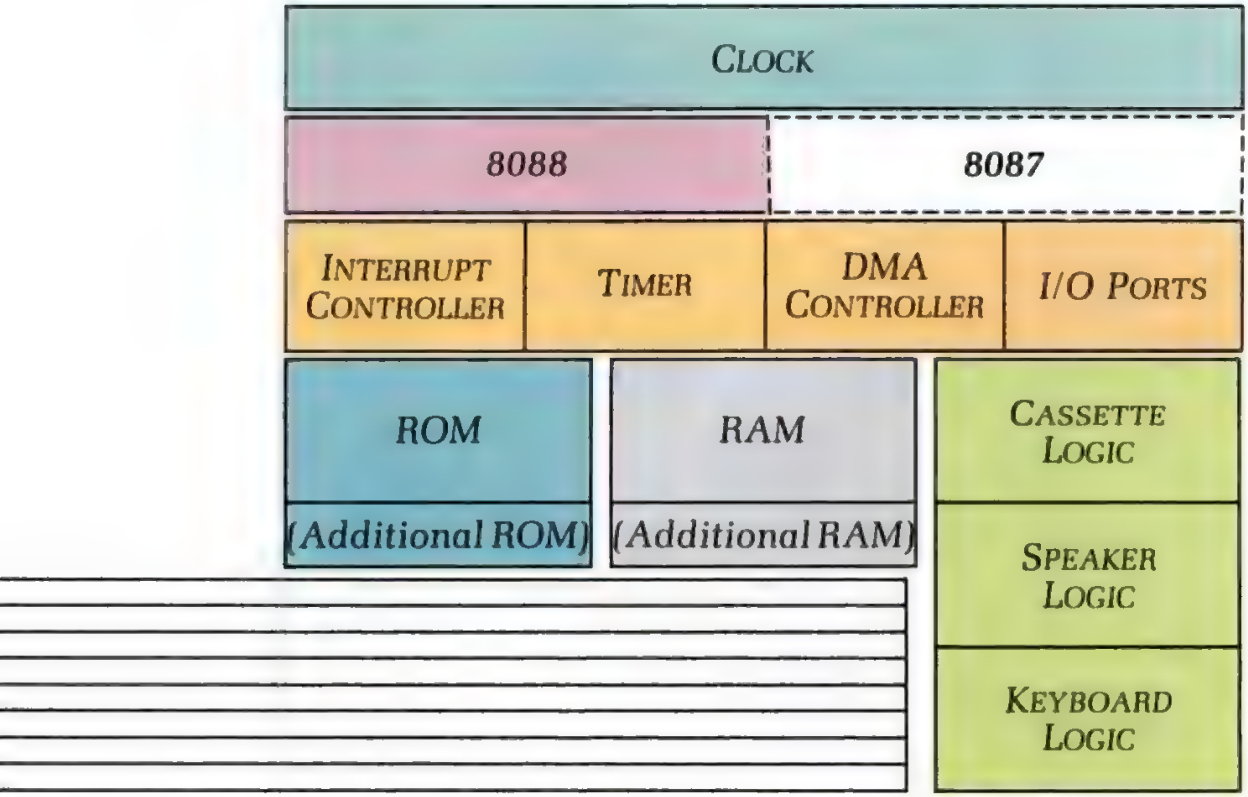
Bushwah! True the better editions of the Keytronic keyboard are whisper-silent and sport little winking LEDs. But IBM's keyboard isn't bad; okay, its long-reach takes some getting used to, but it makes the others look sick. What else do users grouse about? Short keyboard cables? No problem, buy yourself an extender. No IBM modem? Pick up the Hayes that IBM uses in its product centers and its promotions. IBM's snazzy 8-pen XY plotter too tough on the wallet? Six smaller ones can be yours for a relative song.

In fact, you can now buy peripherals to do everything from turning on your coffeepot to weighing your mail to dialing your bookie. And this is just the beginning. Practical voice recognition circuitry, speedier co-processors, cheaper storage, and effortless networking are just around the corner, and when they hit the market you'll see a torrent of gimmicky hardware that would make NASA look like Romper Room.

The Configurator on the following pages shows the range of equipment available right now that can be hooked up to your PC. And we've been receiving new product announcements at a frenetic clip, now almost 200 per week. With prices coming down and manufacturers vying to cram friendlier and more versatile features into their hardware, your PC will soon be able to run anything ever made with printed circuits or motors inside, and perform Boolean gymnastics beyond your wildest dreams.

—*Paul Somerson*




CLOCK
8088
8087
INTERRUPT CONTROLLER
TIMER
DMA CONTROLLER
I/O PORTS
ROM
(Additional ROM)
RAM
(Additional RAM)
CASSETTE LOGIC
SPEAKER LOGIC
KEYBOARD LOGIC

Don't let price get in the way of owning a quality printer.

Adding a printer to your computer makes sense. But deciding which printer to add can be tricky. Do you settle for a printer with limited functions and an inexpensive price tag or buy a more versatile printer that costs more than your computer? Neither choice makes sense.

Here's a refreshing option – the new, compact STX-80 printer from Star Micronics. It's the under $200 printer that's whisper-quiet, prints 60 cps and is ready to run with most popular personal computers.

The STX-80 has deluxe features you would expect in higher priced models. It prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. It offers both finely detailed dot-addressable graphics and block graphics.

And, of course, the STX-80 comes with Star Micronics' 180 day warranty (90 days on the print element).

The STX-80 thermal printer from Star Micronics. It combines high performance with a very low price. So now, there is nothing in the way of owning a quality printer.

*Manufacturer's suggested retail price.

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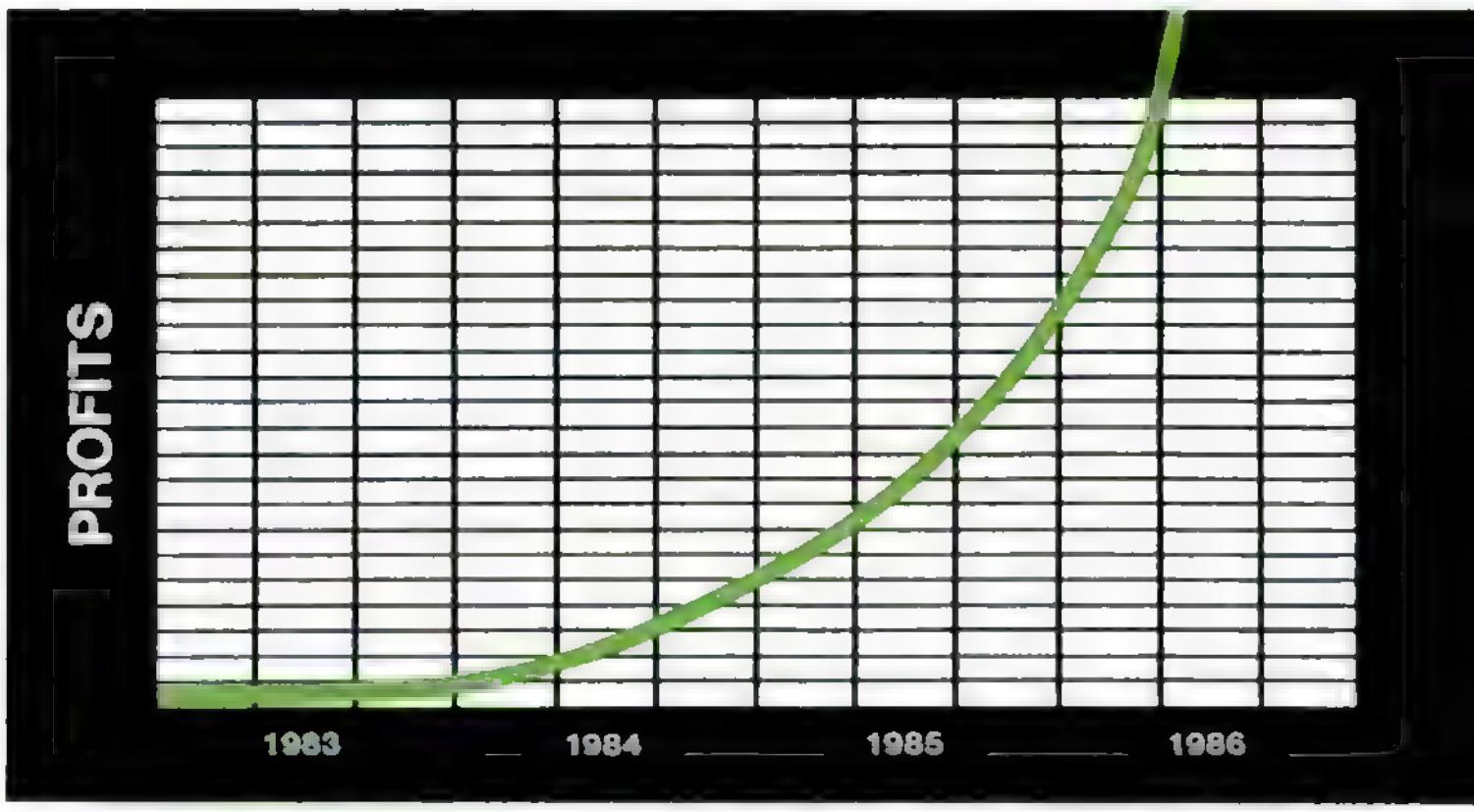
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The new STX-80 printer for only $199.*

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The future never comes with any guarantees.

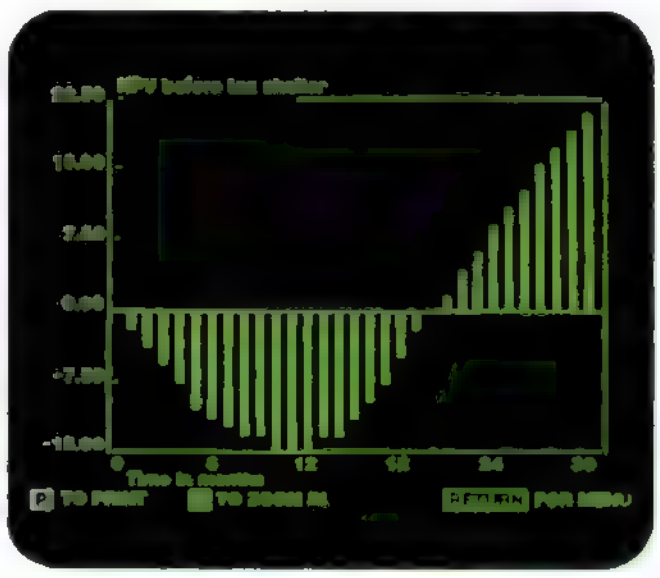
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It's a microcomputer program called the Bottom Line Strategist.™

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With the Strategist and your microcomputer, you can explore *alternative* business decisions and get answers to the questions common to any business focused on growth:

How much money are we risking? Will the business be profitable? When? Is that soon enough? Can we improve this by changing the price? What's the impact of our assumptions on net worth, cash flow, market penetration and growth?



The Strategist uses seven sophisticated econometric models originally developed for companies on the Fortune 500 list.

But it's pre-programmed, so all you do is enter your current business assumptions, then sit back and watch the dynamics of your future unfold graphically.

The Strategist plots (and tabulates) your marketing and sales projections; anticipated cash flows; break-even point; Net Present Value; and more—a total of 11 production, financial and marketing forecasts.

If any area looks interesting, the unique "zoom" takes you in for a closer look at the picture. And if you don't like what you see, do it all over again.

Instantly.

Without any programming.

And do it as often as you need to get the results that you want.

Tomorrow's answers today.

The Strategist is a unique short-cut to experience, without the hard knocks.

You can refine your pricing policies. Optimize your cash flows. And maximize your profits while minimizing your risks.

In today's business climate, how much is that worth? The Bottom Line Strategist is $400.

Our no risk offer.

You can check out the Bottom Line Strategist with no financial risk.

Drop by a dealer showroom and run through a hands-on demonstration. Then take home a package and use it for 30 days. It runs on 8-bit and 16-bit microcomputers (IBM PC, Apple II, CP/M, etc.) If you don't like it, return it and you'll get your money back.

For the name of your nearest dealer, contact Ashton-Tate at 10150 West Jefferson Boulevard, Culver City, CA 90230.

Better yet, call (213) 204-5570 today. Because if time is money, the Bottom Line Strategist is money in the bank.

The Bottom Line Strategist™

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In addition to the Cybernetics twins, **RM/COBOL** and **CRT!**, we offer source program licenses for the most comprehensive microcomputer business applications...the MBSI Realworld[3] software written in **RM/COBOL**. Starting life as the minicomputer-based MCBA[9] business applications, this software brings a new degree of professionalism to microcomputer applications.

Our software is available and supported for a wide range of microcomputer operating systems including CP/M,[4] CP/M-86[4], MP/M[4], MP/M-86[4], PCDOS, MSDOS[5], OASIS[6], TRSDOS[7], UNIX[8], and RM/COS[1]. Contact us for details.

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COVER STORY/PAUL SOMERSON

After hauling 16 tons of PC-hardware to photo sites all over New York, the author was discovered clutching a $4,000 color board while mumbling 'I want, I want . . .'' When asked what was the matter, he replied . . .

If I Had A Million

Ok, I admit it, I'm a no-holds-barred hardware junkie. If you can plug a cable into it, I want it. There's something seductive and intoxicating about sleek off-white curvilinear cabinets crammed to the gills with green printed circuit boards, each sporting a geometric grid of chips as clean and beautiful as a Mondrian painting. At the last COMDEX, the sight of Quadram's new boards embedded in thick slabs of polished lucite took my breath away. They were things of beauty, artifacts like flies in prehistoric amber.

Software can be a time-saver and fun to work with, but you get tired playing the same record over and over. I'd rather have carte blanche at a computer hardware store any day. Toss in *WordStar* on a RAM disk and a medium-high-level language for tinkering, and I'm in seventh heaven.

One of the original PC's most short-sighted features, in the opinion of many experts, was its paltry five expansion slots. In my fantasies, all my expansion chassis sport their own expansion chassis in a daisy chain extending to the vanishing point, and the whole contraption is powered by a direct link to a dedicated reactor at Three Mile Island.

Sure, to some folks a dream PC configuration is a single-sided, single-drive 64K unit with a bare minimum two add-on cards and a home-brewed RF modulator hooked to a flickery 1950s-vintage round tube console that had trouble three decades ago pulling in "Howdy Doody"—whatever gets the job done. Still, I'd rather work on that bare bones system than suffer with . . . a typewriter . . . or (cringe) a pencil and a legal pad.

IBM Cheese Slicer

On the other hand, each time I read a new issue of *PC Magazine*, bulging with the gleaming products of a thousand different advertisers, I practically have to wear a lobster bib so I don't drool on the slick lithography. While it's true that I don't really need a $5,000 Kratos high-resolution analog color monitor or an Electrohome 6-foot RGB projection screen that takes four guys to lift, I sure would like the chance to put both of these through their paces, push the pedal to the metal and see what they can do.

There is a limit to all this. We're starting to see a new wave of amusing products that promise to turn your five grand worth of chips and busses into a postage scale or a Mr. Coffee alarm clock or a precision cheese slicer. Unless you are trying to extend your electronic home or office of the future to the limit just to see how many cables you can snake into the back of a PC, this seems silly. Still, if anyone wants to send me one of these, I'll plug it in.

Every so often, on a slow news day in the summer, a local supermarket lets some lucky contest winners run amok and keep everything they can haul away in a frenzied 5-minute tribute to Thorstein Veblen. You've all seen the photos, I'm sure, of the chunky housewife wedged into the magenta spandex jeans, and her semi-crazed, raw-nerved spouse tearing up and down the aisles, clutching maps to the meat counter, five or six baskets in tow, screaming hoarse instructions to one another, sweeping armloads of tinned smoked octopus and hearts of palm into their carts and flinging jetsam onto the linoleum, while their neighbors bounce up and down on the sidelines like spastic game show contestants who had just snagged a Noah's Ark of plaster lawn ornaments or a lifetime supply of pen wipers.

Well, give me a couple of minutes in the back room at Boca Raton, or a mere quarter hour shopping spree at NCC, and I'll make those frantic yahoos look like finishing school graduates.

Stuffing a Gig

For starters, I'd grab me one of every co-processor board made—a 68000, naturally, and a real 8086 and a 186, and while I'm at it, a 286 and a 188 and a 288, and now there's a 6502, and of course all three Z80s. And the obligatory 8087. Not that I'd know what to do with all these chips, but it sure would be fun to sidle up to a group of hapless PC owners who are comparing notes, and casually drop into the conversation, "Me? Oh, I'm running a pair of 68s and the entire Intel line. Got an Apple coboard too, and the trio of CP/Ms—though these days all I use is their 64K."

Mass storage is always a problem, so I'd probably want a few hard disks, and while we're at it, some muscular streaming tape drives. I hear Santa Clara Systems offers a 120-meg Winchester for the PC; I think I'd need a pair to give me a quarter gig of space. And a half dozen cartridge Winchesters to balance things out. Maybe some external mini-floppies, too, just to be covered; there are at least three competing formats to confound any attempts at standardization and I wouldn't want to be caught short. Then maybe some of the new vertical technology floppies that let you store data across a disk's surface AND down into its oxide coating, and for show, one of each of the new half-heights.

How much RAM? Here I feel gypped; the PC can only address a scant megabyte, and chunks of that are reserved for such trifles as video memory and ROM. Well, my 68000s would make short work of that, and I see that companies like Raytronics are crowing about boards that can handle the entire meg, and plug in either the standard 64K chips or the new 256s. And while I'm thinking about it, make them ceramic chips; they cost more than the plastic ones so they must be better. What I am going to do with this acre of memory isn't exactly clear, but it's good to know it's there. I could turn some of it into a spooler but that would mean foregoing external printing buffers. And if anyone is ever going to look under the hood, I'll want something that will knock his socks off, like a module of cryogenic or charge-couple-device RAM, with the liquid hydrogen steam boiling madly off the refrigeration unit.

YOU COULD detonate an MX warhead in the main Con Ed switching station and my dream PC wouldn't bat an eyelash.

RAM Juice

Now RAM is plenty handy when you're using a disk-bound program like old faithful *WordStar*. Throw bit-mapped version 3.3 onto your chips, load in your data file and you're ready to fly. But I'm always terrified that a freak magnetic storm or the Aurora Borealis or something is going to streak overhead and take my PC momentarily to the bit cleaners. So I 'KO copy every other paragraph to a floppy (especially now that MicroPro has made it easy to reconfigure function keys).

What this country needs is a RAM board either with its own juice or otherwise hooked into a non-interruptible power supply. Well, there's CMOS, but it's bulky and I'd have to worry about the batteries. I'll snap up a few dozen K anyway. And a couple score K bubble memory too.

Speaking of power, my wall current would be massaged and smoothed out by so many in-line filters that Thomas Edison himself wouldn't recognize it. You could detonate an MX warhead in the main Con Ed switching station and my dream PC wouldn't bat an eyelash. While we're at it, there'd have to be a slew of ni-cads in the closet and a small Honda diesel generator in the alley. In the next New York City total blackout, all you'll see from the air is the lights from five hospitals . . . and my PC.

Want to ring me up? My modem would have auto-dialing, auto-answering, auto-redialing, auto-encryption and decryption, a fingertip directory, full duplex, half duplex, echo-plex, speeds up to 9600 bps, pulse and Touch-Tone, four-level phase shift keying, *PC Talk* firmwired-in, and an electronic switch interrupter to blast a clear line through any Bell Central office in the world, to bypass such nuisances as busy signals, nosy operators, wiretaps, and password traps.

Mice for Octopi

For fun, I'd have such an array of input devices that I could keep my keyboard in a drawer. A maze of mice, both mechanical and optical; bit pads and touch pads; touch screens; sonic, resistive, and magnetic digitizers (both 2D and 3D); light pens; track balls; both types of joysticks; and enough paddles, triggers, foot pedals, and steering wheels to hypnotize an entire cub scout troop or keep a herd of octopi occupied. I'd want the IBM game board except I'm against it on principle; all the circuitry on it should be the left end of one small chip delivered with the system unit. Finally, I'd slap in a third-generation speech recognition board that could underline text from the tone of my voice and pick the proper homophone from its context. And if anyone knows about a smart hand-held optical reader/scanner that would allow me to input text by waving a flexible wand over a page at a time, I'm interested.

Of course, if a manufacturer announced the availability of a separate function keypad with programmable LED labels, and about 40 more programmable function keys, each of which could hold a couple K of characters, I'd fly to the factory tonight cash-in-hand and pick up serial number #000001.

The graphics workstation I really want

costs a tidy 400 grand, but that's the price you pay for high-speed 4M by 4M res these days. I'd settle for half that, which means we're talking analog all the way. Control Systems is pushing a 1024-square board with half a meg onboard RAM; if I couldn't do better, I'd settle for that. For output there's only one display of choice: the main multi-color billboard in Times Square. I mean, put that on one wall of your living room and you've got the drop-dead conversation piece. Of course a flat-panel plasma display the size of a Greyhound bus would be nice, too. Sony's 25-inch snazzy RGB Profeel isn't bad for a TTL output, but digital is so . . . well . . . old-fashioned. But if you're limited to current canned IBM-oriented software, it's the monitor of choice. It's also the heaviest television I've ever seen; it could give Arnold Schwarzenegger a hernia.

Conographic's forthcoming board, while digital, is expected to offer a combination of vector-styled graphics and a vast library of primitives and utilities that will sprint through image-creation and leave all the others in its dust. Sign me up.

Star Wars Printers

Xerox makes a dandy little laser printer that can crank out copy faster that you can stack it, and it's only $20,000. As the big shots in El Segundo point out, you can't just reach over and plug it into your PC, but with a minimum of tweaking the thing can work like a charm. Still, the quality is about that of a photocopy, and it's in plain old black and white. I've heard rumors about laser or ink-jet printers that can reproduce the spectrum. If anyone can confirm this, let me know, and I'll put one on the list. Then there's IBM's fabled 3801 laser printer, but it would be hell to patch into my PC, since it takes a full IBM 370 mainframe to run it. The thing puts out a respectable 100,000 characters per minute, and practically needs the equivalent of an old steam engine coal stoker to load the boxes of paper it eats.

I'D FLY TO THE factory tonight cash-in-hand and pick up serial number #000001.

The NEC 3550 Spinwriter is built like a Sherman tank, bangs out snappy impact printing, and will let you feed just about anything into it—but at a dinky 35 cps, is far too slow. While I'm pretty happy with my NEC 7730, I hear next year the company is updating it to wire in some word processing smarts and add on the standard breathtaking NEC forms handling. According to leaks, they're working on a version due a bit later that will be faster than the current 55 cps. I can't wait. The new Diablo 630 ECS boasts 196 characters on one daisy, plus switch-selectable firmware to yield 400 or so combinations of characters. Then there's the Fujitsu, rated at a rabbity 80 cps, but I've never seen one. I want them all.

Nodes on Borneo

Tektronix and Hewlett-Packard and one or two others have some enormous flatbed plotters I wouldn't mind taking home if I knew I could get them through the front door. These can come in handy if you're charting the hourly history of the world from day 1, or the monthly ad hole for *PC Magazine*. But I also might need 8 by 10-inch transparencies, and could definitely make do with a Dunn floor model camera, or in a pinch, one from Matrix, Modgraph, or Image Resources. While we're at it, Tecmar's VCR interface would let me save a frame at a time on standard videotape—a fun toy and a useful tool for animators.

The PC can handle dozens of languages but can sing in only one voice. There are several big unnamed companies working far into the night to change this, and how could anyone refuse? Even Commodore and Atari can make the PC's music ability look flat. A full diapason organ keyboard would be a plus, as would a pair of 50-inch movie theatre speakers. And while we're at it, how could we miss a state-of-the-art speech synthesizer that could tell jokes in a dozen dialects.

Put me down for one of every communications board with the word "net" in it somewhere. I want to be tied in to anyone anywhere with a free node, especially my European pals hooked into Arpanet. Heck, I'll bounce data off the moon to throw it to Borneo if I can find someone there with a PC. And to think I complain about my phone bills now.

The Robot Arm of the Law

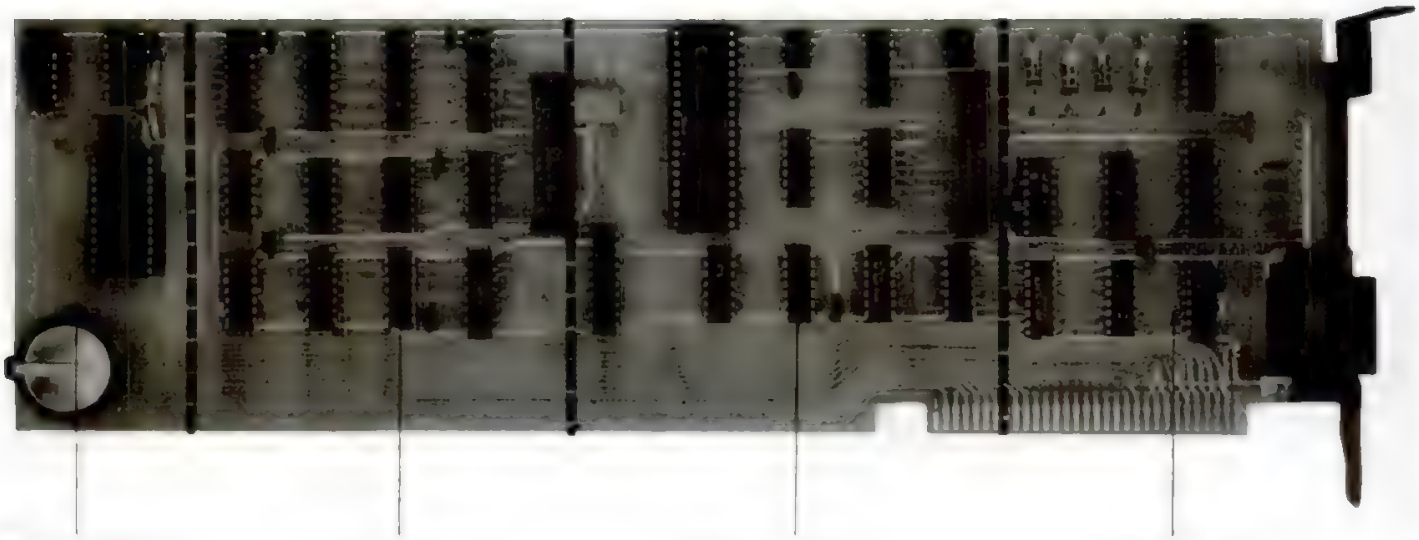
Ok, there are scads of other fun items anyone can plug in today. Tecmar's Video Van Gogh digitizer for instance. You can hook it up to an inexpensive monochrome TV camera and take video snapshots with your PC, picking up 16 distinct gray levels. Might even be able to grab frames off the air and fill up your disks with rerun stills of Sergeant Bilko or Dobie Gillis. And I'll obviously need banks of parallel and serial ports as long as my arm, including the next generation of high-speed serials. And a clock that not only stamps files but chimes the hour and marks the tides. And enough emulators so that I forget there's a PC under there somewhere at the bottom of the pile. And a special filtered, fan-driven 1.1x atmosphere-pressure room would be nice as the ultimate dust cover.

PUT ME DOWN for one of every communications board with the word "net" in it somewhere.

But what would really top the whole thing off is a robot arm, perhaps the IBM RS1 (though this is usually driven by a Series 1 computer). If anyone unauthorized gets too close to the rest of all this equipment, the robot arm reaches down, grabs the intruder by the scruff of the neck, and pins him until the riot squad shows up.

Fact is, the PC is an astoundingly versatile hunk of metal and silicon, and you'll soon be able to patch in just about anything mechanical or electrical made today, if you can't already. And remember, the micro age isn't even a decade old. What's ahead is exciting, and halfway scary. More of the same, only faster, smaller, portable, vastly more powerful. The IBM PC has turned *de facto* standards into official ones. Megatons of future hardware are scrolling across CAD CAM screens at this very minute and the lion's share will be hammered together in the months ahead expressly for the PC and its imitators. I can't wait. */PC*

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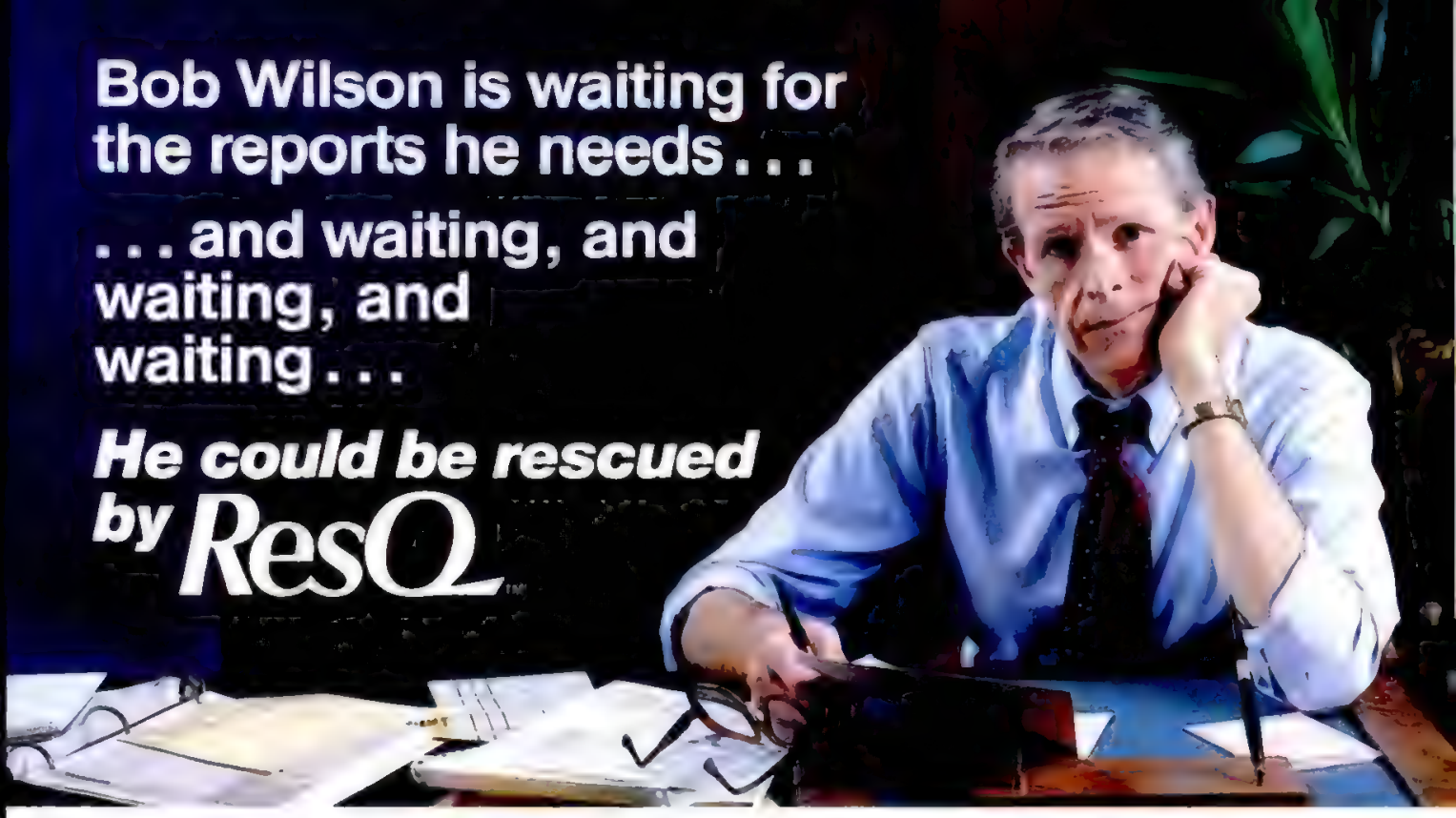
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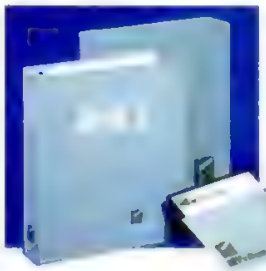
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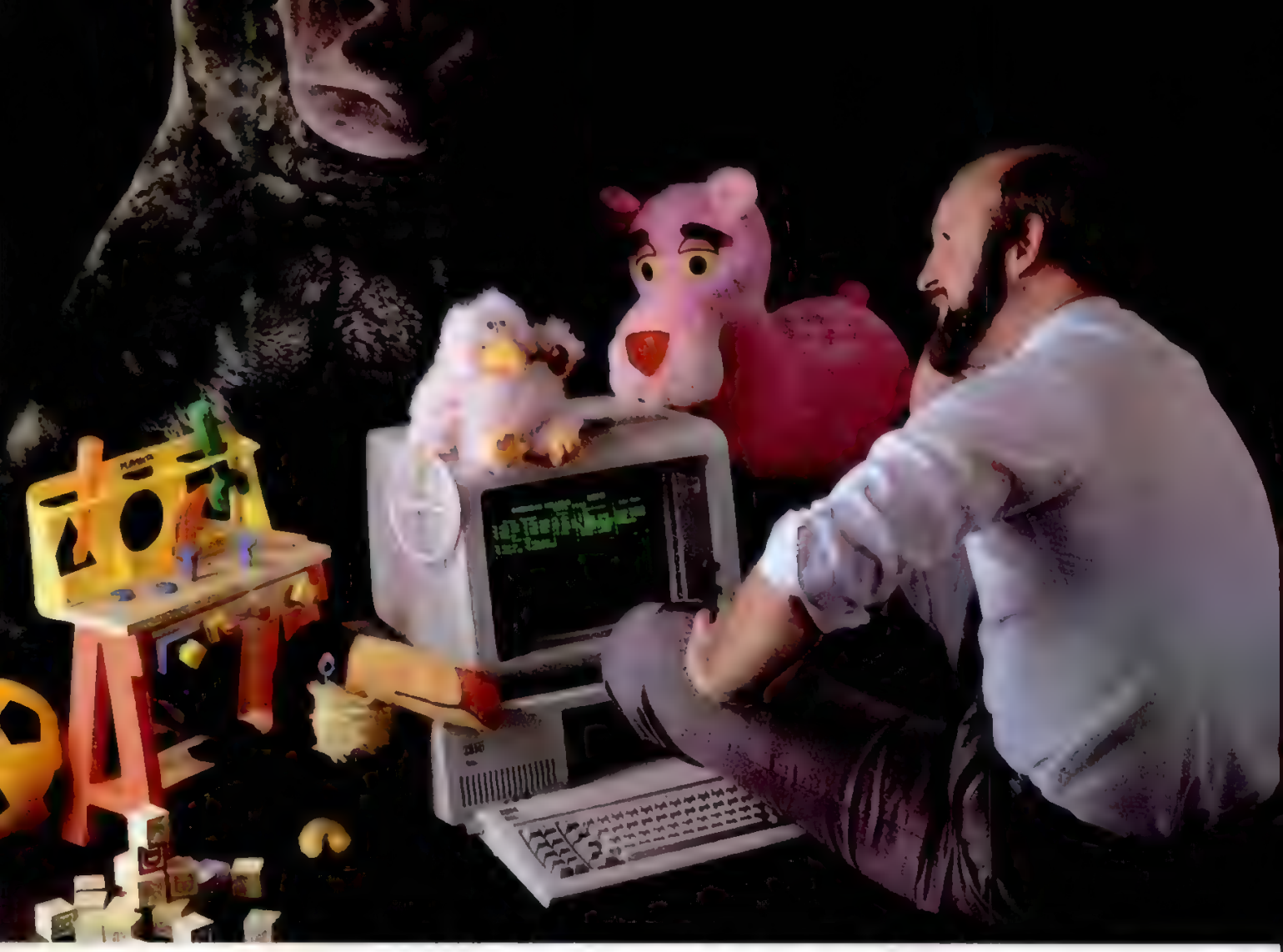
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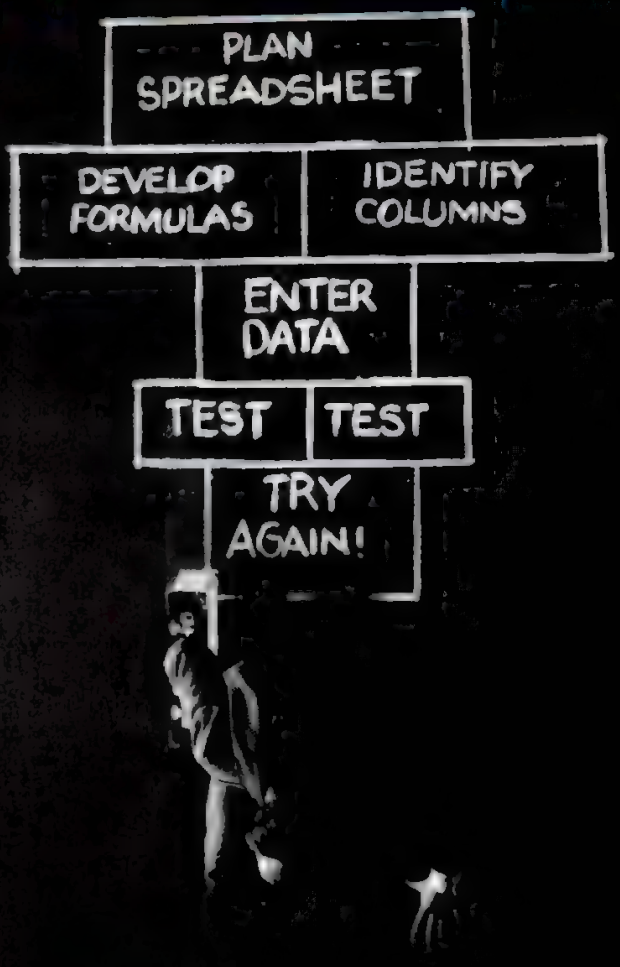


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NEC's new Spinwriter letter-quality printer is the *only* one plug-compatible with the IBM Personal Computer. So you get the business applications you've been wishing for. Letter-quality output for word and data processing. Multi-language, scientific, and technical printing. Simple forms handling. Quiet operation. And the reliability of the industry's most popular printer line.

NEC designed the new Spinwriter especially for the IBM PC. It comes complete with documentation and training materials to fit your PC user's handbook. Just plug the Spinwriter in and your PC instantly becomes more versatile and flexible.

More than 8 forms handlers and 50 print thimbles boost PC versatility.
NEC designed the Spinwriter's 8 modular forms handlers to accommodate a wide range of paper and document sizes and types. The easily mounted handlers let your computer print out the forms you need for data processing, word processing, graphics, accounting or other business applications.

The Spinwriter's 50 print thimbles can more than triple your PC's usefulness. They come in both constant pitch and proportional-spaced fonts, plus in foreign language, technical and scientific versions. They snap in and out in seconds, and let you print up to 203 columns on 16-inch paper. They each last for more than 30 million impressions.

This printer's special features make everything look better on paper.
The Spinwriter's software-invoked features include automatic proportional spacing; bidirectional, bold and shadow printing; justification; centering; underscoring; and sub/super scripting, all at speeds up to 350 words per minute.

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The Spinwriter 3550 is available at **ComputerLand** stores, **Sears Business Systems Centers** and **IBM Product Centers** nationwide.

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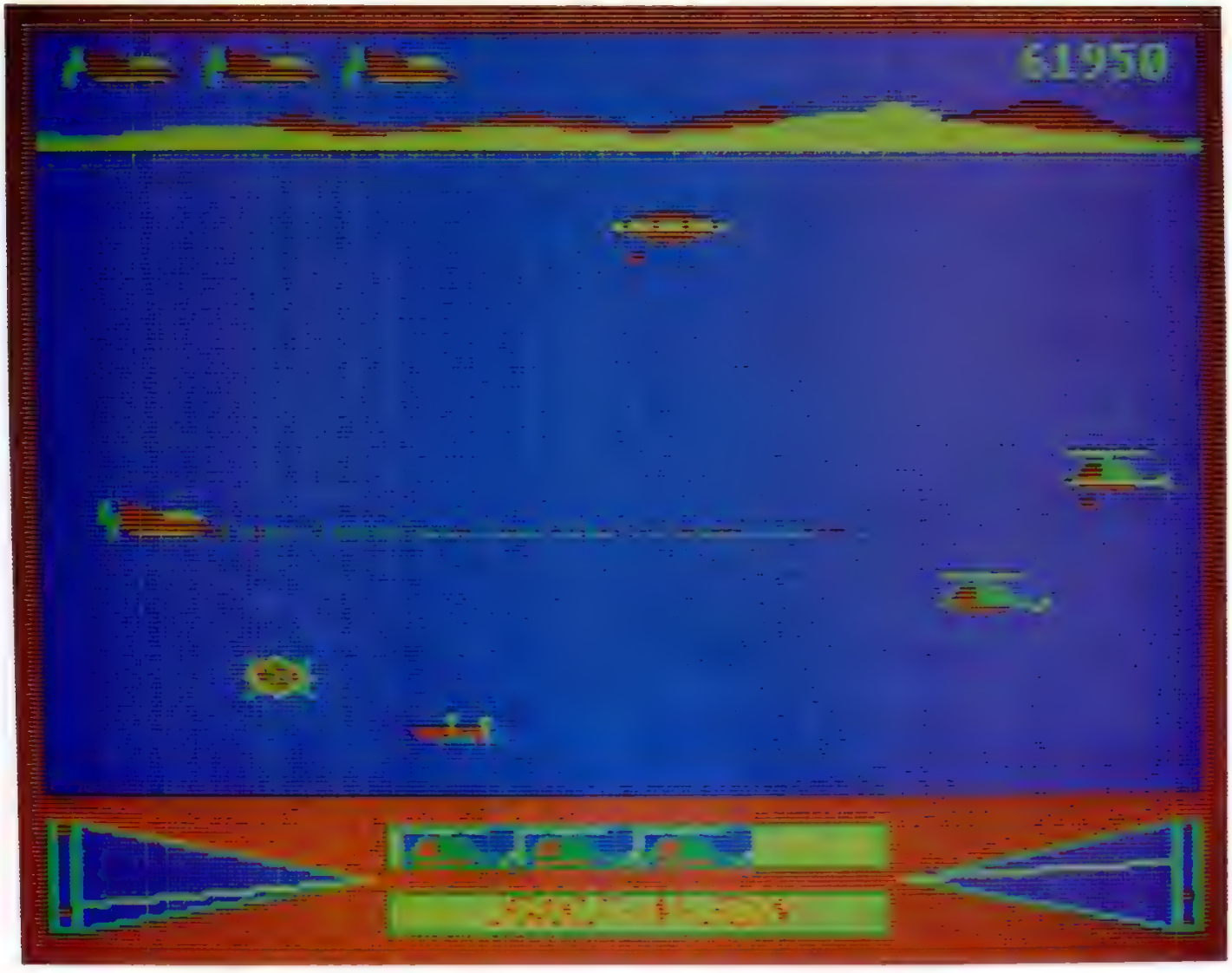
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CIRCLE 342 ON READER SERVICE CARD



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CIRCLE 492 ON READER SERVICE CARD

Meet the Competition.

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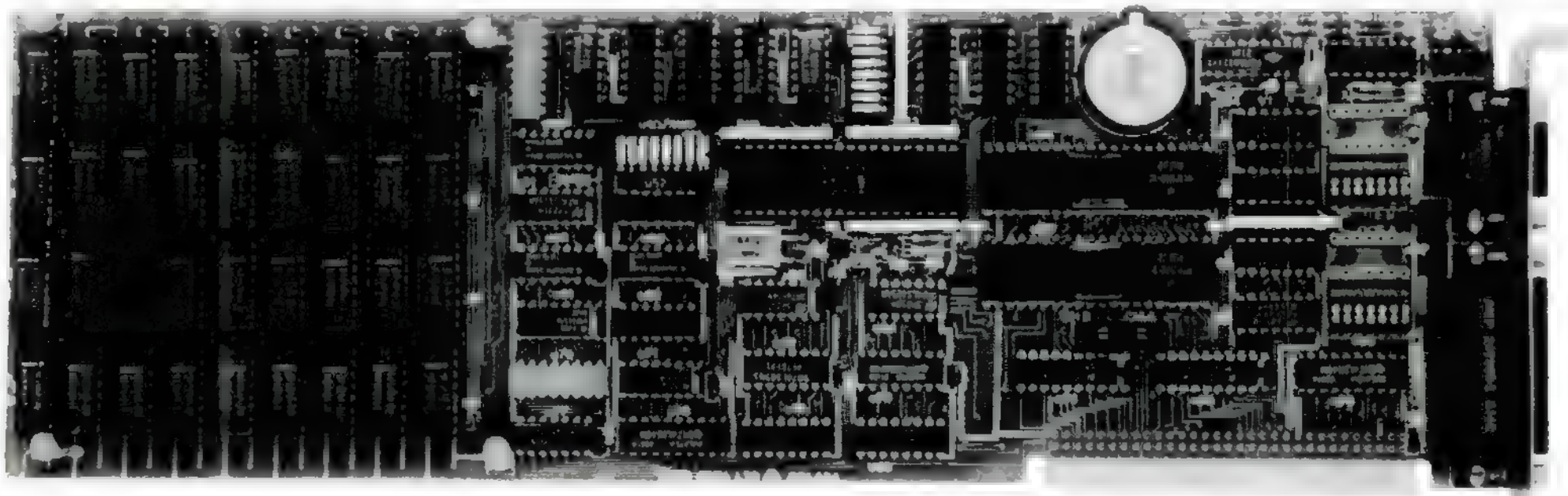
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CIRCLE 288 ON READER SERVICE CARD

Enjoy the RAMific

PDI464

Pure Data presents the unparalleled combination board for your IBM* Personal Computer.



The PDI464 features six separate functions — expansion memory, two asynchronous serial channels, a real-time clock, a disk emulator, and a print spooler. Together with its high quality, the PDI464 offers a price-performance ratio that is tough to beat.

The memory section of the PDI464 provides up to 256KB of fully socketed expansion memory with parity generation and checking. Four memory sizes are available from 64 up to 256KB to meet a variety of needs. Regardless of memory size ordered, each PDI464 is tested with a full compliment of 256KB of memory to ensure trouble-free future expansion. Disk-based memory diagnostics are included which can test memory integrity and report problems down to the chip level.

Two asynchronous serial channels are provided which are completely compatible with IBM serial channels. Each channel can be selected to reside at one of four addresses to allow for future expansion. A unique feature is provided which allows simple selection of data terminal or data communication equipment [DTE/DCE] configurations, thus eliminating the need for special cables or null modems. Each channel comes complete with a 6 foot RS-232 cable.

The Real-Time Clock section features quartz-crystal control and lithium battery back-up to ensure years of trouble-free operation. The RTC features hours, minutes, seconds, day-of-the-week, date, month, and year with automatic leap year adjustment. Software is provided to initialize system time and date information automatically upon power-up.

p-Disk™, a disk-emulation package provided with the PDI464 allows memory to be treated as an ultra-fast disk drive. p-Disk™ can be configured as a single or double-sided drive and can appear as drive B, C, or D. p-Disk™ does not require modification or patching of the BIOS or DOS files on system diskettes and is fully compatible with IBM software and diagnostics.

A background printer spooler is included with the PDI464 which allows files to be printed on a printer while other software is being used in the foreground. The spooler offers features such as menu-selectable configuration, multiple copies, and upper case options.

Comprehensive documentation is provided with numerous illustrations to simplify installation procedures. All documentation fits neatly into existing 3-ring binders provided with the Personal Computer.

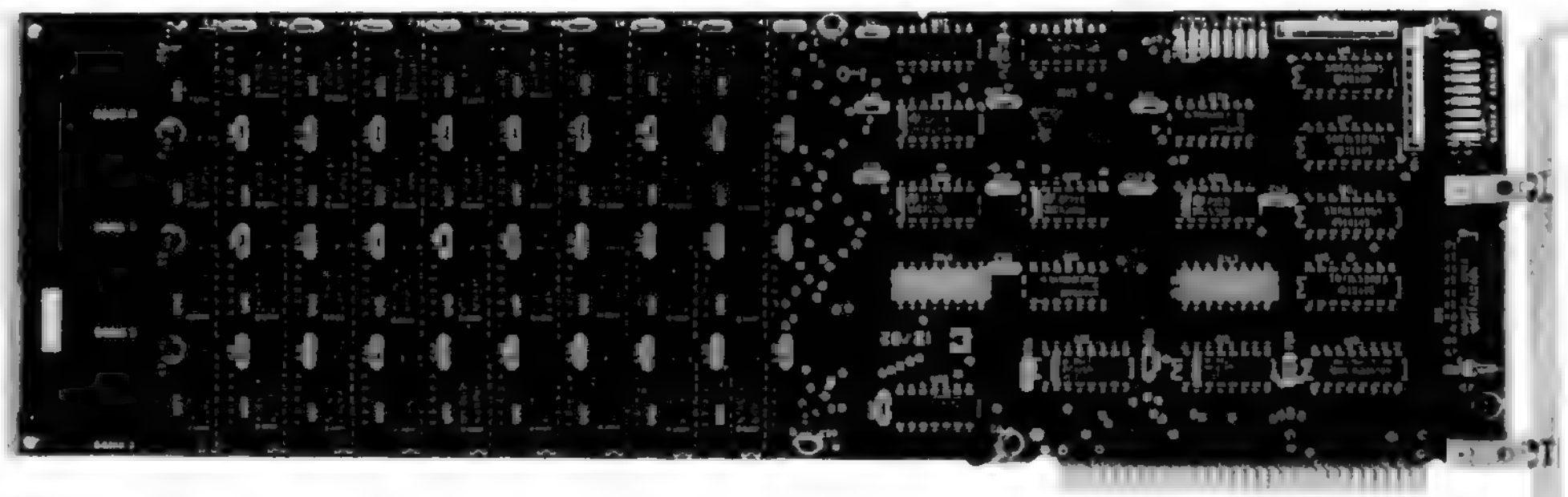
Each PDI464 is "burnt-in" at elevated temperatures and fully tested. Packaging material provides protection from static and mechanical shock during shipment to further ensure reliability. The PDI464 is covered by a one year limited warranty.

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256KB Expansion Memory for your IBM Personal Computer.



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- ☐ Each 64K bank is individually addressable and locatable on 64K byte boundaries
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- ☐ Nickel-plated bracket and card guide included

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AS A SPOOLER,
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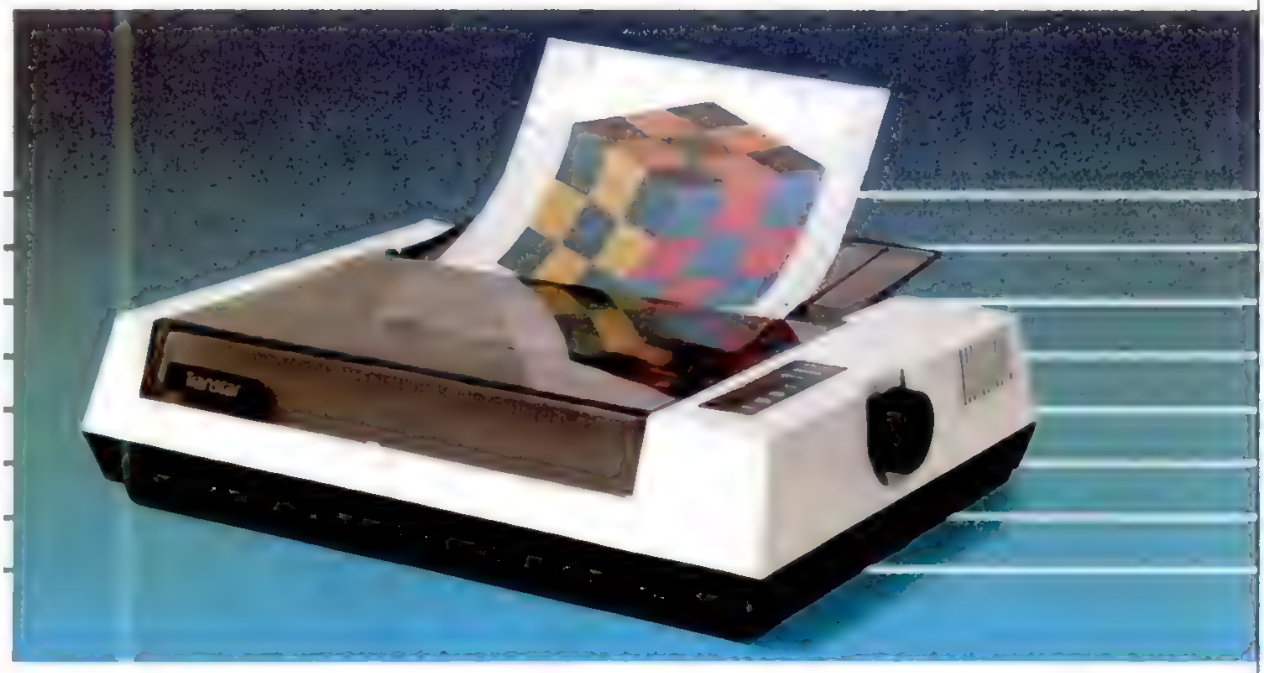
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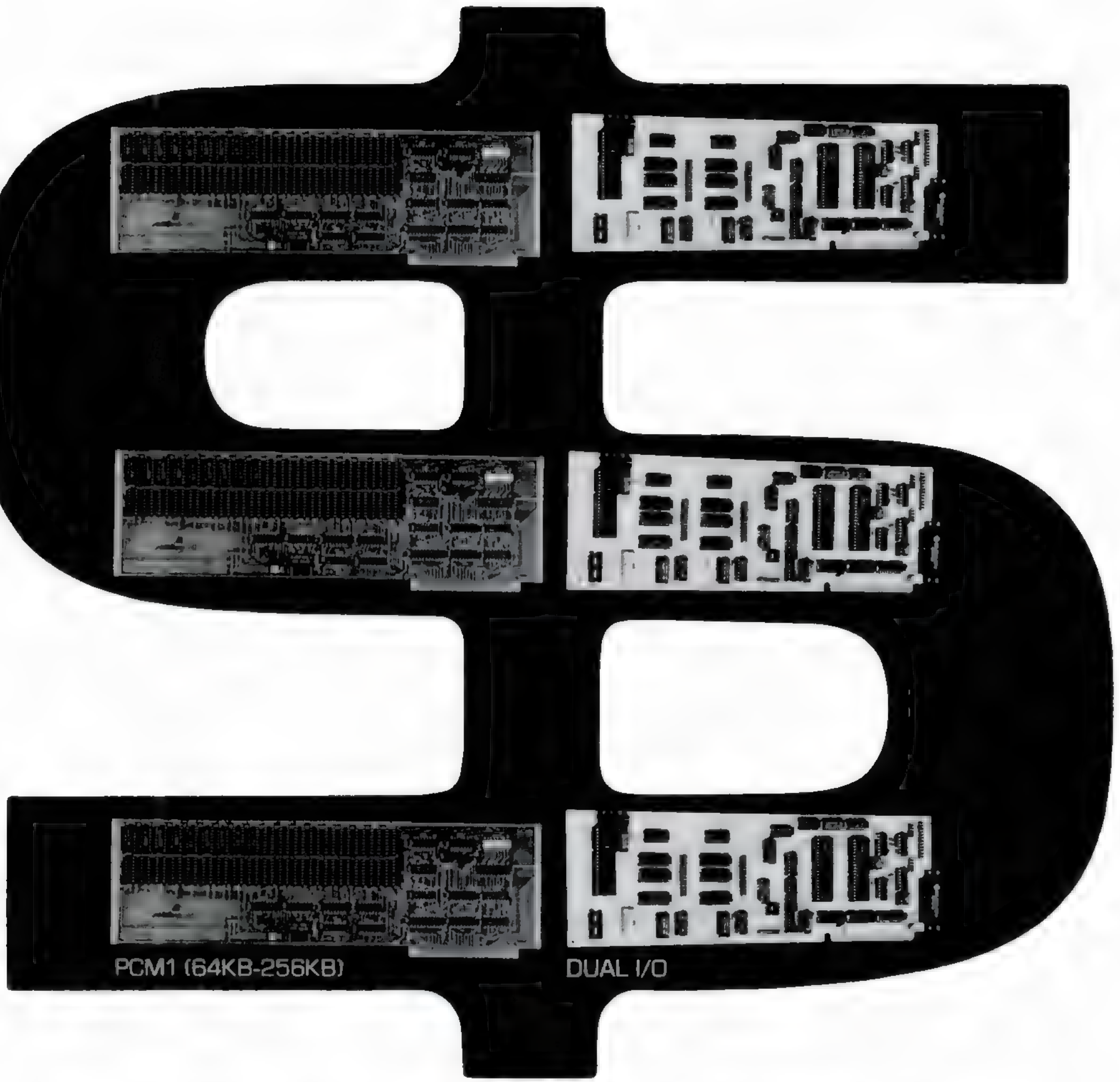
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Are computer salespeople insensitive, unhelpful know-nothings? Does John Q. Public expect too much? Come behind the counter where the answers to these and other urgent questions are revealed . . .

Counter Intelligence

It's almost guaranteed. Walk up to anyone banging away at a PC and bring up the topic of computer stores and you're likely to hear a big blue streak of invective that would make a dockwalloper blush. The way many IBM PC owners tell it, computer salespeople are a full notch below snake oil vendors, used car dealers, and child molesters.

I recently bumped into an old friend on the street who had purchased a PC in the old days, back before micros graced the cover of every periodical in the country from *Time* to *Ms*. This was one cool, calm, imperturbable customer, the kind who could giggle at situations that would have other men pulling out handfuls of their hair. Stress meant nothing to him; on being told that his wife had transferred his entire stock portfolio and her generous affections to a lounge lizard, he simply shrugged it off with a smile. In our circle of acquaintances he was known as "The Iceman."

We chatted amiably for a minute or two, and I innocently mentioned that my computer dealer had been giving me problems about one of my errant disk drives. An astonishing transformation took place. His eyes narrowed to slits. The granite jaw jutted menacingly forward, lips curling into a sneer. His alabaster complexion took on the tint of a Harvard beet. He groped for words, but could only sputter, like a lit fuse, something about peripheral incompatibility and being stuck with single-sided drives and defective software and undelivered hardware and broken promises. Billows of steam hissed out of both ears. His steely 6-foot frame was racked with violent convulsions. The poor fellow dropped to the sidewalk and







The author trying his hand at selling PC's in Atlanta's Peachtree ComputerLand. In this sequence, he explains why it's not such a good idea to edit a WordStar document when the only command you know is Control-Y.

sobbed loudly into his open palms.

Necktie Party

While in most cities such a display would normally draw a crowd of gawkers, our fellow New Yorkers simply detoured around him. Several sneered at the inconvenience. One tossed him a quarter. I managed to lure him into a nearby bistro, where after pouring down enough gin to paralyze a Kodiak bear, he poured out a stinging tale of woe that had the other patrons ready to storm the glassy doors of the local computer store armed with pitchforks, straw torches, and a noose.

I was no stranger to the crass insensitivity of computer salesmen. While my own experience was no match for The iceman's jeremiad, I freely admit that most of my friends and I put our neighborhood PC vendors in a class with alimony judges and dog-kickers.

I'd been bitten by the bug a year or two ago when I found myself retyping the same stilted paragraphs ten or twenty times, each time yanking the offending page from the platen in a rachety rage, and in one fluid motion, crumpling and sailing it across the room at the empty refrigerator carton that served as my wastebasket. In an idle moment I happened across a glowing report penned by a writer who had just purchased a word processor. This awestruck wordsmith was trowelling on the hype with the effusive zeal normally reserved for pimply puppy-love letters.

Salad Days

I had toyed with computers years before, but my recollections were a bit fuzzy and altogether negative—faded memories of dropped and hopelessly randomized stacks of punchcards, unwashed nerds in flannel shirts with the buttons in the wrong holes who'd sneer if you couldn't hard-wire programs with spidery jumper cables in the dark, and the terrifying, and all too frequent, cry "the computer is down!"

Still, there were times when everything clicked and the enormous Calcomp flatbed plotter spun out its intricate lissajou figures, or when the balky IBM line printer clanked quatrains of steamy computer poetry. Okay, so maybe I wasn't using it to figure out the area of a hypothetical intersection of 27 rods of different sizes passing through each other at different angles, but I did have fun.

So when I realized it was possible to buy a word processor and have a high-performance computer thrown in, all to oneself, no lines for terminals, no waiting 2 days for printouts, I dashed down to my local newsstand and cleaned out its entire stock of computer magazines. I'm a sucker for packaging, and like everybody else in the civilized world, have long felt that buying a typewriter from a company other than IBM was an act of temporary insanity. (Now, however, the IBM dual-pitch correcting Selectric II I thought I could never live without sits in a corner, shrouded in its funereal dust cover, its anachronistic gimbals and cams cranked into action only when I have to address an envelope.)

Since the choice between the TRS with its pathetic graphics and drab gray box (honestly, how can a businessman buy anything from a computer company with the word *Shack* in its name?); the stubby, toy-like Apple, which didn't even offer lowercase letters; and the classy IBM, was no choice at all, I emptied my bank account and scooted over to the single outlet of a computer chain that shall remain nameless, although it is the largest such chain in the nation.

I had spent several sleepless days drafting and redrafting my list of parts until I knew exactly what I needed. And since I was paying cash, and in my previous job had *hondled* suppliers down to their knees, I was sure I could cut myself a sharp deal, maybe even bully and cajole the salesman into tossing in an armload of free software. With my sweaty and temporarily fat checkbook in hand, I breached the door, expecting a cordial reception from the salesman. I expected him to be happy to close this easy $4,000 deal. After all, he stood to gain a lifelong customer whose friends would soon be swarming into the place in such droves to buy their own systems that the sales staff would have to schedule visits from Brinks trucks on the half-hour to cart all the greenbacks away. I mean, IBM was a classy operator, and it would be scrupulously careful about the way it treated its customers, right? Two steps inside the place this naive reverie was shattered.

Down MemoryLand

An obese, menacing Harpy leaned over and thrust an enormous pinguid arm in my face. "Where do you think you're going? Waddya want?" As I opened my mouth half in astonishment, half in a frozen attempt to answer the question, she turned away to flail at the buttons of a telephone ringing off its hook as it flashed like a Christmas tree. "Pyutlan, hold . . . pyutlan, hold . . . no he can't talk to you right now, no I don't know when he will be available . . . don't you talk to me like that . . . service lines are busy . . . pyutlan, hold . . . I don't care if you have been waiting half an hour . . . no one can help you right now . . ." She slammed the receiver into its cradle as it blinked and jingled madly away.

"I want to b . . . b . . . buy a computer . . ."

"Yeah, sure, you and everybody else. Well you just gonna have to wait until a salesman can help you."

I looked around for a salesman. They were easy to spot. They were the ones literally running away from knots of anxious customers, each trying to ask a question, make a purchase, get an answer. I joined the smallest crowd, following a particularly arrogant salesman. As I recall, he was wearing a sharkskin suit and a pinky ring and had a bordello mustache, but memory

WHILE IN most cities such a display would normally draw a crowd of gawkers, our fellow New Yorkers simply detoured around him.

I WAS SURE I could cut myself a sharp deal, maybe even bully and cajole the salesman into tossing in an armload of free software.

has a way of blurring details. He was mechanically fielding all queries with the identical line, "I'm sorry, I can't help you . . . too busy . . . come back when it's not so busy . . ."

Chorus: "When is that?"

"It's always too busy . . . sorry, can't help you . . ."

I turned my attention to the plaintive pleadings of the customers. "Please, the system you sold me still doesn't do what you promised after 3 weeks . . . All I want is the price of a monitor . . . You didn't tell me that printer wouldn't work; what am I supposed to do? . . . Can I just ask one question?"

Cold Feet

I wasn't exactly getting cold feet, but I wasn't feeling very confident about the place either. Still, IBM had that 24K-gold reputation, and I was sold on the system I had been chewing over for days and days. All I wanted was to hand the guy my check. Well, maybe another salesman. I wandered off to a different equally frantic group of consumers. The salesman was cemented in front of a PC. Questions were raining down on him. He had no answers.

"What kind of letter-quality printer can I hook up to it?"

"Will this hook up to my mainframe?"

"What kind of resolution on the color screen?"

The guy was obviously a greenie, and a bit pale. He flicked his gaze out to us for an instant and blurted out something like "Now, *VisiCalc* is a spreadsheet program that helps you with your business . . ."

The relentless questions continued. The salesman sweating and constantly adjusting his tie, failed to field a single one of them.

"How does an IBM with a word processing program compare with a WangWriter?"

"Why does the IBM have such limited disk storage?"

"What kind of charting programs are available?"

The salesman hit the Enter key several times. Nothing happened. He typed something in. Nothing happened. He turned away from the screen and paled. "Now, there's a typing tutor, and there's a way to get this to show you mortgage payments, but I'm not sure how it works, but it also has a *VisiCalc* program, which can definitely help you with your business . . ."

I looked around. There were computers everywhere, but almost all of them were turned off. Parts and boxes were stacked helter-skelter to the ceiling. In one corner a middle-aged salesman was demonstrating some equipment to a well-accoutered pair of businessmen while fending off trash like me with the back of his hand and an occasional well-timed snarl. Two small urchins nearby were pounding their tiny fists onto a stained keyboard to add to the din.

A wild-eyed fellow my age walked up to me and asked if I was a salesman. I told him no, but he refused to believe me. "I know you're a salesman. I've seen you here before. I've been here a dozen times in the last 2 days. I know I've driven all the others crazy, but I can't figure out how to program the computer and I've had it almost 2 weeks! You've gotta help me!"

If this store had any decent competition, I thought to myself, it would be out of business in 2 days. More people spilled through its doors, some staggering under the weight of stacked up hardware they couldn't understand. Others tugged at the salesmens' coats. Everyone in the store was whining. "Puhleeze help me . . ."

"I can't help you."

"Just answer one question . . ."

"We're too busy to answer questions."

"When is the best time to come in when you aren't so busy?"

"We're always busy . . ."

Busy Signal

Wait a minute, I thought, I'm not shopping. I'm not asking questions, I just want to buy. That shouldn't be too hard, right? I waited patiently until there was a momentary lapse in the frantic activity and then waved my checkbook in front of the salesman. "I know what I want . . . who can take down my order?" The salesman didn't flinch. "Be with you in a while, we're really busy right now . . ." A massive matron gave me a shot in the kidneys with something blunt and heavy. "Hey you, I've been here for an hour and a half already . . . I was here first . . ." The salesman backed away from us all. It was getting hot. It was getting very noisy. My kidney began throbbing. I summoned all my New York rudeness and blocked another salesman's escape route. "All I want to do is place an order . . . can't anyone take my order?"

"Yeah, yeah, sure, just a minute . . . we're awfully busy, why don't you come back . . ."

AN ASTONISHING transformation took place.

I CAN'T figure out how to program the computer and I've had it almost 2 weeks.

Three Stooges vs. IBM

So I left. Maybe it was the wrong time. I'd call up and find out when the slack period was and I'd even type out the parts and the IBM part numbers to make it easy. So I tried to call. And I tried to call. And I tried to call. And finally I gave up and went back down. And it was worse. I waited for over an hour again, and it was a shivaree. I half expected them to be shooting a stupid Jerry Lewis movie there, or maybe "The Three Stooges Open A Computer Store."

So I left the second time and stood outside, despondent, nose pressed to the glass, with checkbook held limply in my hand. A professorial type with a little goat beard trundled up. "Trying to buy a computer?"

"Yes, why?"

"Same thing happened to me. I was in here four times and all I got were insults and rudeness. So I went straight to IBM."

"You mean IBM sells directly to individuals?"

Suffice it to say that IBM had just opened four product center offices inside New York banks (which meant salespeople went home at 3 p.m.) I sauntered into one during banker's hours and they were delighted to take my money. And even

though their big Armonk computers hound me to this day about an erroneous hundred bucks they think I never paid, my PC has me on cloud nine.

Computer Chic

Perhaps my chilling reception at that first store was just a circumstance of being in New York. I'm not entirely unsympathetic. IBM and everyone else spends a fortune promoting micros, and the population at large wants to see what all the fuss is about. The average schmoe, who has no conceivable need for a home computer, wants to tell his buddies he played around with one. "Sure, I seen a computah, I used one . . ."

And there are the customers who don't read the manuals and think you plug it in and it somehow runs your business like some omniscient, savvy robot speaking in a science fiction voice: "Now . . . hire . . . two . . . more . . . clerks . . . and . . . renegotiate . . . your . . . lease. . . ." or who expect to master their system overnight. Or the ones who buy a serial printer and claim to know a secret way to hook it up to a parallel port, or who want something bizarre, like an interface to hook it up to a tractor engine and a toaster-oven. "But you told me it would run a gelding machine . . ."

I have to sympathize a bit with the folks on the other side of the counter. Aside from the clods who want to brag to their pals that they've toyed with a PC, and dolts who don't want to read the manuals, there are people who want model numbers so that they can order hardware by mail. Later, they'll be back demanding support. Then there are idle adolescents, or businessman, reeling in after a five-martini lunch, who want to be entertained.

CAN ANY salesman smile after fielding abuse from dozens of abusive New York types?

But I have to fault the store I visited. It kissed off a $4,000 to $5,000 sale. I was so uninformed back then that I could easily have bought my whole system in one shot. These days I know that mail order is a decent alternative when handled properly, and that local user groups can offer irresistible discounts across the board. But it still seems that a store should offer courteous, polite, instructive assistance. If there is too much traffic (can any store really have too much business?), then open branches, or hire more help.

Then there's the problem of help. Can any salesman smile after fielding abuse from dozens of abrasive New York types? Or spend an hour with someone who's going to walk out with the hardware list you've just meticulously cobbled and proceed to the discount store around the corner? Can any salesman last at this miserable job dealing with a largely ignorant and nasty public when anyone with a decent knowledge of computers can land a plum of a job with a large company as a computer expert? Would you?

PC MAGAZINE wanted to find out if customers were justified in their complaints about vendors and vice versa.

Does IBM Tell Gimbels?

It's finally happened—the total demythologization of the PC. They're hawking IBMs down at Macys. You can almost hear the bored elevator operator: "Third floor . . . ladies' underwear . . . fourth floor . . . pots . . . fifth floor . . . IBM computers . . ." Glorified video game computers fill the bins at K-Mart, and the word is that IBM's low end computer will be sold that way as well.

This has spawned an almost universal curiosity, and thousands of status-conscious consumers are now crowding into the stores and "just looking, thank you" to make sure the computer revolution doesn't pass them by. Most of these have no conceivable use for one, although an entire industry has sprouted overnight to cater to their invented needs with packages to inventory their libraries and wine cellars, pay their bills and remind them of appointments. Unfortunately for entrepreneurs, it's still easier to stick an important reminder to the refrigerator door. And anyone who needs a computer to balance his checkbook, will by definition have trouble with a computer—at least until manufacturers start making future models a whole lot friendlier and more forgiving.

Another problem is that computers are still fairly new, unstandardized, and difficult to cable together and boot up. Some people have trouble hooking up even a stereo. Computer operating systems are a long way from being invisible and automatic. And there is much misinformation making the rounds, compounded by an unwillingness of most folks to learn before they buy. So you have weekend data-dabblers ordering a system unit from one store and the wrong drives and printer from another. "I know what I'm doing . . ." And then blaming it on the salespeople. "I know you warned me but you shoulda made it clearer . . ."

Counter Intelligence

What's it really like from the other side of the counter? Are purchasers generally ignorant or well-informed? Are hordes of trendy browsers a problem? Do customers walk in the door knowing what they want or do they need to be told? What are they using their computers for? Are there many who shop for model numbers, then make their purchases by mail or from a local discount house?

PC Magazine wanted to find out if customers were justified in their complaints about vendors, and vice versa. But not in New York, the rudeness capital of the world, city of shrugged shoulders. So we trekked to Atlanta and set up shop in the two local ComputerLands, one in a wealthy suburb, the other in the heart of the city.

The two stores draw customers from all over Georgia and even from out of state. The suburban store has been in operation for about 5 years, the downtown store since August 1982. The suburban branch was the one of the earliest ComputerLands in the nation—the twenty-ninth store in the chain. There are now well over 300 ComputerLand outlets.

We spoke at length with the head of the suburban branch, Carol Andrews, who at

23 is probably one of the youngest computer store managers in the company. She admits that when she came to ComputerLand looking for a job, she was more interested in the fact that it was a successful retailing operation than in the merchandise it sold, but she has since been bitten by the computer bug.

CERTAIN customers call every couple of minutes with questions like "How do I do a Diskcopy or a Format?"

She directly supervises six salespeople and one serviceman. There are three servicemen at the downtown store as well as six more salespeople. The two stores employ a total of 40 people. She feels that her store is typical of most in the chain, though she freely acknowledges that different ComputerLands can "have different personalities."

One From Column A

Carol Andrews' particular store had what she termed a "very good sales volume last year"; she put its performance in the top ten across the country. Oddly enough, she doesn't own a computer herself. "I have everything at my disposal here during the day and I can stay here as long as I want. I play around with all the computers in the store for different reasons. I like the IBM and do most of my work on it because I find the keyboard and its function keys easy to use. A lot of the salespeople and I also like the Sony because of its advanced graphics editor. We all use the Fortune because it can handle Unix, and some of us think the future is in that direction. And we like the Apple for games. Each one can do different things and is attractive to prospective purchasers for different reasons. It is fairly easy for us to select the proper one when a customer comes in and tells us what he needs."

According to Andrews, what distinguishes computer retailing from other types of merchandising is that people need a great deal of service and support.

TIME-WASTERS are not a serious problem right now, but it's going to get worse as this thing starts snowballing.

"Customers need someone to call when they have a question. Your 'fast food' type computer dealers cannot handle that effectively." Perhaps because of this,

A Store A Day

ComputerLand's planned worldwide expansion indicates rising interest.

According to industry-watchers at Future Computing, sales of small computer systems costing $1,000 or more may reach $7 billion this year. Retailers are expected to grab half of this pie, with the balance going to mail order dealers, systems houses, industrial distributors, office products suppliers, and the more than 150 systems manufacturers themselves.

Future Computing puts the number of computer retail stores at 2,100. (Others claim there are as many as 3,000.) Over one third of all sales funnel through independent dealer networks. The largest of these is ComputerLand, with over 400 outlets in a total of 25 countries (it opened its 400th store, in Hong Kong, at the beginning of the year).

The Hayward, California-based retailer recently announced plans to open 275 new stores in this country in 1983 and another 20 overseas. Some of these will be smaller "satellite" stores, owned by existing ComputerLands, and located within several miles of the mother stores in shopping malls, college bookstores and department stores. Satellite stores will specialize in non-business software and will carry a limited selection of home and educational computers.

The company's first franchise opened in Morristown, New Jersey in early 1977. There were 24 stores by the end of the first year of operation, and 382 by the close of 1982. New ComputerLands now spring up at the rate of 10 to 15 each month, and in the next few months will open at the rate of one store per day. In 1981 the company grossed $151 million; in 1982, $451 million. This year it hopes to hit the $1 billion mark.

A franchise costs $75,000, but the total startup package, including rent, fixtures, inventory, etc. can cost between $100,000 and $250,000. Average sales hover around $140,000 per month, up from the $60,000 per month grosses of 3 years ago. Stores in some of the biggest metropolitan areas may gross as much as $1 million per month, and $8 to $10 million per year; those in the remotest climes are said to pull in as little as $500,000 per annum.

Each franchisee has access to over 5,000 products from more than 250 manufacturers, including 20 systems producers, although most carry only four to six main computer lines. In April 1982, Apple Computer decided it wanted final authority over which ComputerLand outlets could carry its products, and ended its long-standing arrangement with the chain's central purchasing arm. Apple subsequently made separate store-by-store agreements with 70 to 80 percent of the franchises.

In the first few years of operation, ComputerLand's sales were divided fairly evenly between business and consumer products. At present, however, business purchases account for slightly more than 75 percent of the chain's gross. Company executives feel that the home, entertainment, and educational markets will be the areas of greatest growth in the years ahead.

One interesting note: According to W.C. Lowe, director of IBM's Boca Raton development lab, when IBM initially approached ComputerLand, the chain was not interested in carrying the PC. It took a personal demonstration by Don Estridge, General Manager of the Personal Computer Group, to make the sale. —PS

ComputerLand's service center will gladly service products purchased elsewhere.

Andrews says that 70 percent of her customers are men, mostly aged 30 to 50, who are "amazingly knowledgeable," which surprised her at first. "The average businessman has already read a number of computer books and magazines, and has done all the necessary homework before he walks in the door. Of course, we have to fill in homeowners who know they want to buy a computer, but want you to tell them why and what they're going to do with it."

Her business is divided evenly between single and multiple sales. Many business customers buy more than one, but this is offset by the large number of individual purchases for home use. Most of her multiple sales are relatively small. The most she says she's ever sold to one customer is about 100 units, and that was over a long period of time.

How Much Is That PC In The Window?

She characterizes her customers as being openly price conscious. "They want to know what they're getting for their money. They want to know if your prices are competitive with those of the other stores in town that sell the same product. There are four computer retailers carrying the same basic product lines within a mile of here. Atlanta's a hot city and new stores are just popping up like popcorn. There are at least a dozen now."

ComputerLand won't discount merchandise, but does publicize periodic specials. When we were there the store was giving away a choice of software worth 10 percent of the purchase price of the hardware.

Andrews' customers generally have no complaints about IBM's prices. When IBM announced its recent price reductions, she says, half her customers already knew about it and the other half were pleasantly surprised. Her customers get much of their information from business publications such as the *Wall Street Journal* and from computer magazines, and generally keep up-to-date with such developments.

She feels most of her customers are not impulse buyers. "When people, especially businessmen, visit us initially, they essentially know what they want. Most don't come in unless they really feel they're going to make a purchase. Sure, some go to computer stores just so they can tell their friends they went down and played with computers," she admits. Andrews added, however, that most visitors to her store really want to buy a computer, but either aren't ready for the present generation of micros, or vice versa.

Heavy Traffic

"You can spot the browsers," Andrews noted. You do get some people who say 'Tell me all you know about computers but I don't want to buy one today.' The overall percentage of these is low, perhaps 15 percent. Most of them visit on Saturdays, which is our heaviest traffic day. People who come in during the week are almost all serious purchasers. About half know exactly what they want, and come in with a list written down. The rest drop by and say they want a computer and want to be told which one is best for them."

OUR STORE IS an absolute zoo on most Saturdays.

The computer that most people say they want to buy or at least look at is the IBM PC, and according to Andrews, this trend has been true since the PC was introduced. The store also carries Apple, Osborne, DEC, Sony, TI, Fortune, and others. She says that none of the others is moving up the list "at the speed of light, the way the IBM did."

Andrews claims the only programs most people have heard of before they walk in are *VisiCalc* and *WordStar*. "Customers usually come in and say, 'I'm interested in word processing, something like *WordStar*.' Then it's up to the salesperson to see what the customer's needs really are." Most businesspeople want either spreadsheets or word processors. One trend she's spotted that she finds curious is that businesspeople are a bit reluctant to commit themselves to complex accounting packages before they familiarize themselves with their systems.

Andrews feels that the hottest new area is at the low end of the market, the home users. More and more homeowners are coming in and telling her they want a computer to keep their tax records and balance their checkbooks. At the other end of the spectrum are owners of large businesses who sometimes need more than a single micro. Under such circumstances she'll recommend a multi-user system like the Fortune. "Right now we don't see the IBM as a multi-user system, but there are more and more things coming out on the market that are heading in that direction."

A PC For the Teacher

The downtown Atlanta branch of ComputerLand boasts a far more modern and jazzy interior than its 5-year-old cousin. It has the standard ComputerLand showroom downstairs, and a relatively large service center and warehouse in back. But upstairs, its corporate offices share the floor with a large learning center housing 24 IBMs, a very unusual feature, according to the people who run the franchise. These are used for (very popular) introductory PC classes and advanced sessions on spreadsheets and word processing.

The classes each last 10 hours and cost $125. Often to close a sale, however, store executives will throw in a class for certain customers. "Many of our first-time users take a class because they want to feel educated before they touch the keyboard." A very small percentage take a class before they buy.

One strict selling rule: salespeople are never told to "just sit someone down at a computer and let him play with it." The management expects all salespeople to "find out what the person wants to use a computer for, what his priorities are, how much he wants to spend, and then work

SOME COMPANIES are starting to realize that you need to have something that a customer can sit down and go through by himself.

through it with him—show him one or two computers and determine what his exact needs are."

But this is not always possible. Andrews feels that Digital has put together one of the better customer demo packages, although she also gives high marks to IBM's new XT demo. "You can pull up information about any package that has the IBM label on it, read what it says about it, and print it out. The different manufacturers are starting to realize that you need to have something that a prospective customer can sit down and go through by himself. While you can't afford to ignore a customer, stores are often very crowded and salespeople in short supply. Our store is an absolute zoo on most Saturdays, and you just can't get to everyone as fast as you'd like to. So if you have something like a demo, shoppers can sit down and go through and get a feel for it."

THE PEOPLE WHO waste your time represent only a small fraction of all your customers, although they give a bad name to computer retailing.

Her store does not do any cold calling, although they're starting to expand into outside sales. "Most of our corporate accounts will call and say 'could you have someone come out, we're interested in a particular computer, please bring one and show it to us.' " Because of the demand, ComputerLand established a separate department geared to corporate needs, because "corporate sales can really pay off."

Something For Everyone

Andrews doesn't currently stock any IBM work-alikes, although she is looking forward to adding the Compaq to her stable of computers. "We just can't carry everything for everybody. We try to carry something for everyone's needs. If you already have an IBM, why have others that are like it, unless it's especially exciting like the Compaq?"

On a typical day she sees just under a hundred people, although traffic starts building in September and increases until right before Christmas. She estimates that about 60 percent of her customers come in and say "I want to buy a computer and this is what I want."

"The people who waste your time represent only a small fraction of all your customers, although they give a bad name to computer retailing. But there is a small percentage of people out there who do not respect the fact that there may be a large crowd of people in the store, most of whom are there to buy something. It's more particular to computer retailing because you have to spend time with each person and explain things and get him up to snuff. You don't just say 'here's a computer' and leave.

"It probably takes two or three times before prospective purchasers actually order one. You can usually distinguish between people who want to learn so that they can make an intelligent decision and those who simply want to tell their friends 'I went to the computer store this week and they told me all about bits and bytes.' Time-wasters are not a serious problem right now, but I would take it to the bank that it's going to get worse as this thing starts snowballing more and more."

One of the things that may start the snowball rolling is the meteoric rise in school computer use. "It used to be 'my kid has orthodontics'; now it's 'my kid has a computer.' There's a good percentage of people who order computers for their kids—perhaps around 15 percent of all purchases by homeowners are made for their kids because they're reinforcing what they're getting in school. They're buying IBM's because they're so versatile, and because they can buy it for the kids and can also use it themselves around the house."

Losing Sales

Andrews claims that one of her biggest problems is that her salespeople are too honest. "If someone comes in and says he wants a certain computer and you talk to him about what he really needs and discover that he just can't get there from here, we'll consciously lose that sale."

She says that her long-standing policy "not to sell something to someone that's not going to do him any good," means that returns are very rare. "But you do get an occasional customer who gets it home and simply finds it's not for him or that his wife won't let it in the house. So occasionally I will take one back, depending on the circumstances. It's on a case-by-case basis. A lot of times I won't."

When customers do bring back products, Andrews rotates the returned merchandise into the computer rental program. The store rents Apple, IBM, and Osborne systems to people who come into town and need one for a week or two. She doesn't rent to prospective buyers. "Anyone who rents has to have the software and everything ready to go." There's not yet much of a used computer market, but people do ask if used equipment is available at a discount.

VIRTUALLY all customers appear a week or two after their initial purchase to buy computer games.

"What Manual?"

One of Andrews' biggest problems is with customers who never even open the manuals. "Certain customers buy a unit but are afraid to start getting into it or reluctant to pore over the documentation, so they call every couple minutes with questions like 'How do I do a Diskcopy or a Format?' You have to tell people like that to look on a certain page in the manual—and do it without losing your patience. After all, they did just spend a lot of money in your store and you don't want to blurt out 'read the manual!' and hang up." Sometimes the salespeople suggest to such customers that they take the introductory class, which makes things easier for everybody.

"The trouble is that a lot of people think that by now computers are probably a snap to learn, and they don't like to have to read manuals. Instead, they want to be shown." The sales staff does show every purchaser how to turn his computer on and boot it up before he leaves the store, but many forget how to do it by the time

they get home. "Some people call every 2 minutes at the beginning and want us to take them through every step. That's a real problem for our sales staff. The other problem is the people who say 'I want to know everything about computers but I don't want to buy one.' Still, if you're patient and friendly, you might eventually sell people like that a computer."

Software availability is another problem. Andrews' store can stock only a limited number of programs for each make of computer the store carries. It's difficult for her salesmen to keep current on what new packages are on the market, let alone know how to operate all of them well enough to demonstrate them to new and existing customers.

When customers who buy computers to use solely for word processing or business recordkeeping start using them, they invariably discover how powerful they are, then rush back and want to buy armloads of new software. Or they read about new programs in magazines or hear about them from their friends, and come in expecting the store to carry every single one and be conversant in its use.

"It's very difficult to keep abreast of the thousands of products flooding onto the market and the new advances in technology, but we try to do it. It's almost like being a physician who has to stay atop the newest techniques in open heart surgery. Of course, that's a selling point over our competition."

User-Hostile Software

When she first got into the business, Andrews assumed that customers would complain about the relatively high cost of the software on the market, and is surprised that they don't. What they do complain about is a lack of user-friendliness. "We're seeing more and more first-time users buying computers these days, and they don't have the patience or the knowledge that hobbyists or experienced computer professionals have." But thorny manuals and programs are not affecting sales to any significant degree.

She finds it amusing that virtually all customers, including the most serious-looking businessmen who talk only about using their computers for complex financial analysis, appear a week or two after their initial purchase to buy computer games. They all want to know what the best games are and what will work on a green screen.

The average unit she sells has two disk drives, a screen, and 128K RAM. Nobody buys single-sided disks anymore. And Andrews admits that the entire time she has been in the business, she's sold only one IBM with a cassette tape recorder for storage—and that customer came back later and bought a disk drive. She estimates that her average customer "just sort of wanders in" once a week to see what's new.

One reason customers visit so often is to shop for more software and add-ons. But the store also maintains a library of public domain software for Apple owners, with about 200 programs anyone can copy. She started a similar library for IBM users, but said no one contributed any software to it. "IBM users are a little more possessive of what they write."

IBM USERS are a little more possessive of what they write.

The store tries to keep IBMs in stock, but is often confronted by shortages of hardware and software, especially after a new product introduction. Andrews feels that one of the best selling points of the IBM is that you can hook up products to it from so many different manufacturers. So if there is a shortage of an IBM product, a customer can often find something from another supplier that will do the job.

"It really drives us crazy when a hot item comes out and we can't get it. People call every day for weeks asking if it's arrived yet, which drives us up the wall. The waiting list for DOS 2.0 and IBM's new color monitor is phenomenally long—everybody wants them. And there are people on the waiting list who want to know where they are on the waiting list and how long they're going to be on the waiting list. That's the big bugaboo."

Uniformly Satisfied

There is no IBM product center in Atlanta yet, and Andrews isn't worried that one will open. "Customers may not be sure they want an IBM and many want to look at a range of computers. IBM sells only IBM equipment. If consumers wanted to buy a non-IBM color monitor or a color printer they'd have to make the purchase here. And most want to buy from a store that can support the whole machine, so if their system is a mixture of IBM and non-IBM parts, we're the only place that can service the entire unit. Service is a good part of our business, and it's growing. The more hardware there is on the market the more service people will need."

Most people seem fairly satisfied. The complaints that come in, once users are up and running, are about things like noisy printers or having trouble switching back and forth between color and black-and-white monitors. "They're almost uniformly satisfied. We are very careful about setting them up with a system that will suit their particular needs, and most are very happy once they start using it."

Most prospective customers ask about IBMs and Apples, though Andrews says that more and more people are coming in to see the computer recently released by Sony. "It has very quick diskettes, small disk drives, and excellent graphics. And it's very compact, making it almost a portable unit. Apple has a very nice price. It's a smaller system, 64K, maybe 128K, and there's a lot of software out there for it, especially educational software, so it's great for their kids."

But IBM has been the most popular since the beginning. "Our sales pitch for the PC is based on the name IBM, the versatility of the machine, the flexibility of home and business use, the ease in hooking up products from other manufacturers, and the overall image of quality and reliability. You're not going to have a lot of down time with IBM."

PEOPLE EXPECT us to be here all the time, waiting for their call.

Hot Items

Andrews sees a big difference between

computer retailing and conventional merchandising. "Retail selling used to mean pushing hot items out the door, selling them fast, and turning over inventory as quickly as possible. Computer retailing, on the other hand, boils down to learning what a customer really needs, then trying to figure out whether we have what he needs, whether a particular system is the best one for him, and if he is going to have to spend more money than he was planning on spending to get what he wants. You can't just sell your hot item over the counter and throw it out the front door.

I HAD SOMEONE throw a box of diskettes at me one time.

Computer retailing is 90 percent customer relations. And the customer can't be forgotten once he has made his initial purchase. IBM makes it clear that it wants you and the customer to have a good long-term relationship."

While she acknowledges that hardware improvements are important, Andrews feels that the biggest problem—and growth—area is in developing better software. People often buy a computer and then come back and tell her about a specific problem and ask for software to handle it. But in most cases, the software needed simply doesn't exist. And if it did, it would be difficult for retailers to stock every last item.

"Vertical market software—packages written just for doctors, or lawyers, or engineers—is definitely going to be important in the future. There are a few good vertical packages out right now, but we don't carry any of them. The good vertical software—the packages professionals are going to buy—has yet to be written. So most professionals are limited to using conventional spreadsheets, database managers, and word processors, which isn't really ideal for them or us.

Horror Stories

"The real horror story for us is that people expect us to be here all the time, waiting for their call. They assume we don't go to lunch, or take off Saturdays. And when they call, they expect us to be instantly available to take their call, which is often difficult. Most of the time we're either on a call with someone else, or with a customer, or trying to figure out a complicated configuration or pricing arrangement. People want to have answers to their questions right away, and can't understand it when we're tied up.

"And many of the calls are unnecessary. They'll call and say 'I'm working on WordStar and I don't know how to delete a character and my salesperson can't come to the phone and I'm really upset because I need to know the answer right this minute because I'm working on it right now.' The only thing that is worse is having to support other stores' customers this way.

"We're very happy to answer questions and tell customers how to interface peripherals or handle basic problems. We're proud of the product knowledge and the technical knowledge that we have here. That is one of our selling points for buying a computer from us. If somebody buys something somewhere else and calls and says he can't get his printer to work with his computer, and is desperate for help, how much support can or should we provide? We don't want to be the big bad meanie and say we're sorry we can't help because you bought it somewhere else. But we just don't have the staff or time to field such calls. And again, another of our faults may be that we help too many other people who aren't our customers. These days I try to get my staff to ask such callers who their salesperson was, which screens a lot of noncustomer calls. Supporting other stores' customers is diffiult. On the other hand, if you are really knowledgeable and helpful, perhaps they'll come here next time they want to buy something. We get a lot of customers that way.

Motherboard Blues

"There are crazy questions all the time. It seems we're always telling people you can't get there from here. People sometimes come in and tell us they want to buy incompatible hardware like an IBM with a color graphics board and an IBM monochrome monitor. We explain that such a configuration won't work but some people insist they know a way to hook the two together. Do you sell it to the person or not? If you don't sell it to him, he'll probably go buy it somewhere else and then call us up and say 'I blew my motherboard. I know you told me not to do it, but I blew my motherboard anyway. Now what do I do?' If he's not on warranty, he's in big trouble."

VERTICAL market software—packages written just for doctors, or lawyers, or engineers—is definitely going to be important in the future.

That kind of problem is atypical. A slightly more common one is when people come in who have no idea how much things cost, and expect to buy all the hardware, plus spreadsheet, word processing, accounting packages, and more all for $600. But, Andrews adds, far more customers are surprised at how cheap everything is. "You get more people coming in expecting to spend $12,000 who walk out stunned that they had to spend only $5,500 to get what they needed.

"Once our salespeople learn about computers there is a danger that we may lose them. It's not a major problem right now but it is happening. Every computer company is searching for people with computer knowledge and experience. Just look in the *Wall Street Journal* classified ads. We haven't seen too much turnover yet, but I think it's likely in the near future.

"It is very rewarding when a person calls up and thanks us and says his new computer is the best thing that happened to him since sliced bread. It's also rewarding when a customer comes in and says, 'I was petrified to buy a computer and your salesperson was so helpful and put me at ease and got me up and running right away.' "

This makes up for the problems, and the way Andrews tells it, there seem to be few. I asked her the worst thing that has happened to her. "I had someone throw a box of diskettes at me one time because he had bought the wrong box of diskettes. He had bought it six months before and wanted to return it and I wouldn't take it

back so he threw them at me."

.45 Caliber Disks

Dodging an airborne box of diskettes is a far cry from contending with the madness in the Big Apple. In New York, they would probably throw something a bit more sinister.

What are the lessons here? First, if you're a businessman, especially one who is buying several systems, you're made in the shade. Computer stores will cater to you, even send a salesman to your office.

What if you're not a rock-ribbed capitalist tycoon? For best results, do your homework. Read all about it. Know what you want ahead of time, or at least specifically what you need a computer for. Visit your computer store during the week, at a time when it's bound to be relatively uncrowded. Don't go during lunch hour or at the end of the day or the week and expect the red carpet treatment.

IF YOU'RE A businessman, computer stores will cater to you, and even send a salesman to your office.

It's been said that an IBM PC franchise is a license to print money. And stores like ComputerLand are not offering handsome discounts. So they can't be hurting all that much. You'd think they could hire enough help at least for crowd control on a busy weekend.

Still, they have problems with us too. Browsers who waste their time. Computer industry companies who snatch their best salespeople. Purchasers who refuse to read the documentation. Know-it-all customers who insist on buying systems that won't work. Products that force salespeople to educate their customers and that cannot be sold right off the shelf like microwave ovens.

It's really academic. In a year or two or three, computers will be standardized to a far greater degree, easier to hook together and operate, smaller, and more self-contained. There will be mountains more of software, including better demo software. Computer stores, which still have a high-tech mystique, will be as commonplace as bakeries, and computers will be sold in every department store and appliance shop. It's already happening.

If you need to buy a computer today you have several choices—dealing with the manufacturer, going to a computer chain, ordering by mail or even through a users group or the company you work for. And if you don't like the cut of a particular computer store's jib, just walk around the corner. But don't take it out on the poor salesclerk. It might be me. */PC*

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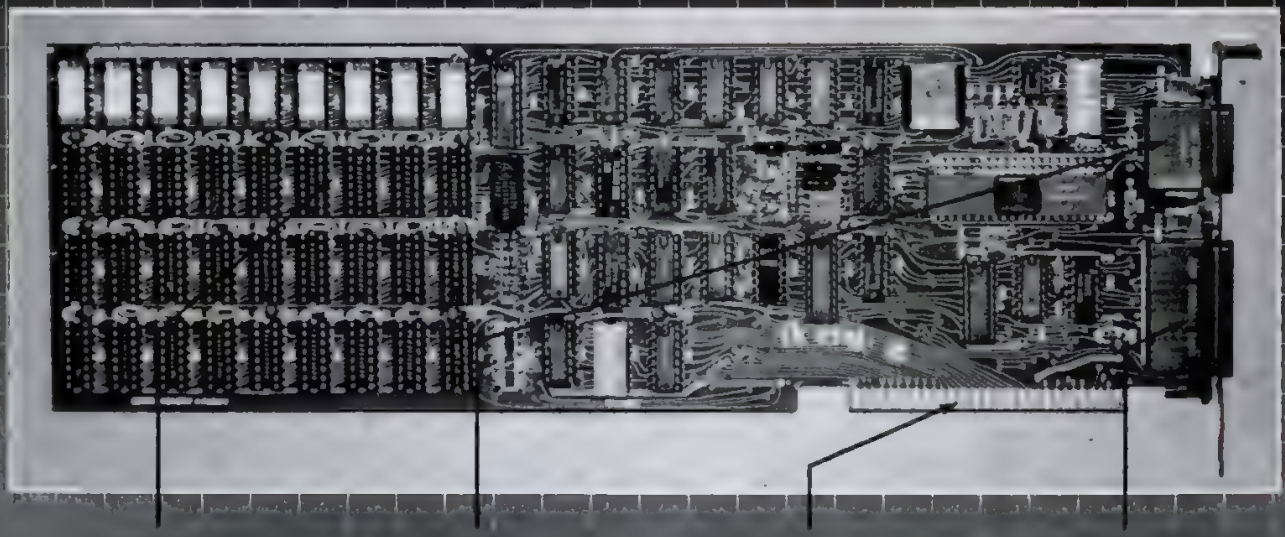
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LEASE, RENT OR BUY? (AND WHY)

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You've had your eye on that IBM PC for quite a while now. You've stopped by every dealership within a 50-mile radius, asking questions and testing systems. You've devoured the magazines, the technical pamphlets, the ads.

You also know what your dream system costs, hardware and software together, down to the penny. You're willing to wait a while for a few of the games, and you'll get the less-than-most-versatile spreadsheet program. But unfortunately, even selling off one or more of your less endearing relatives would leave you just about $3,838.28 short.

Closing out your savings account or selling your stock in Bonzo Metals Corp. to pay cash isn't the only way to get your computer, peripherals, and software. It's time to consider a realistic range of financing options that could move that PC out of your dreams and onto your own desk, temporarily or permanently. We'll explore the possibilities of leasing or renting, how to borrow the money to buy a system outright, and the tax implications of each option.

First, it's necessary to understand the difference between a lease and a rental. A lease is a long-term financing plan under which you make periodic payments; you may end up owning the system at the end by exercising a buy-out option. A rental is a short-term arrangement that generally builds no equity in the system. Both differ

from direct purchase, under which the system is yours from the start, even if you need to borrow money to pay for it.

Why Lease?

Leasing a system is both like and unlike getting a home mortgage. In both

LEASING will cost you more, in the long run, than buying the system outright.

cases, you make regular monthly payments for a fixed number of years. In both cases, the cost of borrowing the money is built into the payment schedule. But there's a key distinction: with a mortgage you own the house and the bank holds a lien. With a computer lease, you don't own anything, unless and until you pay off the balance under a buy-out option. The leasing company is the registered owner during the life of the lease.

It's important to recognize a financial reality from the start: Leasing will cost you more, in the long run, than buying the system outright. This is because you're buying a system and borrowing the money to do it.

So who leases, and why?

"The biggest advantage to leasing is if you don't have the capital up front," observed Joseph A. Leubitz, director of management advisory services for the Chicago certified public accounting firm of Checkers, Simon & Rosner. Or you may want to lease in order to keep your bank line of credit open for another purpose, such as obtaining a loan to meet your end-of-year obligations. Or, as Ann Marie Vitale of H.V. Funding Inc. in Wappinger Falls, New York, put it, "Some people can't go to their bank for various reasons."

Leasing has become more popular as home computers proliferate. Edward Vincent, who operates three ComputerLand stores in the Pittsburgh area, estimates that 20 to 25 percent of his customers are leasing. Sonny Monosson, owner of Boston's Personal Computer Leasing Corp., said the majority of his customers are businesses and professional individuals, including lawyers, architects, and accountants. Vitale said her firm leases only to commercial and professional accounts (although there is no requirement that they be incorporated).

Howard Axelrod of the New York State Consumer Protection Board advises "doing some internal introspection" before deciding whether to lease, buy, or rent. If you're planning a system for business or professional use, Axelrod says, three major factors should be considered.

Growth in business. Will the system you want be sufficient for your future needs? A high-growth enterprise, such as a consulting firm, may find today's system inadequate 5 years down the line. On the other hand, a lawyer who obtains a system now to handle billing, accounts, and legal records, and to prepare briefs and letters, will be less likely to outgrow his system.

Technological advances. In a business with rapidly advancing technology, direct purchase or a long-term lease could lock you into equipment that may become obsolete for your professional purposes; a short-term rental may be more appropriate. What wouldn't be a problem for the owner of a small boutique could be a costly oversight for an engineer.

Cash flow. Consider a young doctor, fresh out of residency and opening a private practice. He has to buy medical equipment and furnishings and pay a support staff. The landlord is demanding rent and a security deposit. Monthly payments are due on 8 years' worth of college and med school loans. There simply isn't any money left over to buy a $6,000 microcomputer. Leasing makes sense here, Axelrod said.

If you want a PC or PC-XT primarily for personal or educational use, some of the same considerations apply. But under such circumstances, said Axelrod, you should consider another factor: the equipment is unlikely to generate enough additional income to offset the financing and interest costs. The 18 to 20 percent you may be charged under a loan or lease will probably be more than the same money would earn in the bank.

Retailers usually don't provide leasing services themselves. Although you obtain your system through them, they're intermediaries between customers and leasing companies. If you're interested, your dealer may refer you to several leasing firms. You may get some approximate costs from the dealer as well, Vincent said, but arrangements must be made between the customer and the third-party leasing company.

"It's more of an accommodation to the customer," said Kenneth R. Waters, vice president for development at ComputerLand's corporate headquarters in California. Waters said ComputerLand franchise holders offer leases if they want, but the majority go through banks, regional leasing firms, or national leasing companies. "Less than 5 percent have their own leasing," he noted.

Leasing companies compete among themselves for referrals from vendors. In fact, it often doesn't matter to the companies what kind of system you get and they may not learn precisely what equipment you obtained until they get the invoice. From their perspective, there's rarely a need to even see your computer—unless the system is repossessed for nonpayment or you decide not to exercise the buy-out option.

Software is normally part of a lease package. At one time, leasing companies restricted the value of the software because it has little residual value to them. Today, such limitations are not often included, or are not enforced.

The typical life of a microcomputer financing lease is 2 to 5 years, although some firms lease for as little as a year, according to Joel G. Heimlich, vice president of American Equipment Leasing Co. Inc. of Pittsburgh. The length of time is

YOU CAN choose among several purchase options when you sign your lease.

negotiable—"whatever the customer feels most comfortable with," Heimlich said.

You can choose among several purchase options when you sign your lease. Only when you exercise your option do you become the legal owner of the system.

According to Ann Marie Vitale, virtually everyone in her firm's experience does end up purchasing the equipment.

You can decide to buy the system for a nominal amount (usually $1) or for a stated percentage of its original value (usually 10 percent) or for its fair market value (usually 15 percent to 20 percent of the purchase price). The option you pick will affect the amount of your monthly payments.

Whether there's an advantage to buying out early depends on the specific terms of your contract and the point at which you want to buy out. For example, Monosson said, Personal Computer Leasing agreements include a fair market value buy-out provision. A customer who wants to exercise it near the end of the lease, say in the last year of a 3-year agreement, can do so by paying for the residual value. If the customer seeks an early purchase—say, one-third through a 3-year term—then the company would negotiate a buy-out price and apply 50 percent of the lease payments toward the final figure.

H.V. Leasing does it differently. To reach a final price with an early buy-out, the firm will calculate the fair market value and then add the amount it would have earned through financing for the balance of the term. Under such a plan there's no financial saving with an early buy-out, although the customer may have a larger tax write-off for the buy-out year.

Leasing doesn't change the terms of the warranty on hardware or software; 90 days is 90 days. Evaluate your need for a maintenance and service agreement on the same basis for a lease as you would for a direct purchase. The leasing company may offer to include a service agreement, for an additional monthly amount. Note that the leasing company may require you to insure your system, whether under a business or homeowner's policy.

Run to Rent?

There are several reasons to consider a short-term rental. You may need equipment immediately to meet a deadline while your own system is being repaired. You may not have enough money to purchase right away. Or you may need a computer periodically, but not often enough or for long enough to justify investing in your own system. Rentals could be appropriate for a small business that does an annual or twice-a-year inventory, or for a lawyer who prepares tax returns 3 months each year.

Rentals also let you test a system or a particular configuration before you make an investment. "Try it out. See what you like," counsels the Consumer Protection Board's Axelrod. "Even though it may be pretty expensive, before making a commitment to a system you could discover that a smaller one will be more than sufficient for your needs."

RENTALS have been relatively scarce so far.

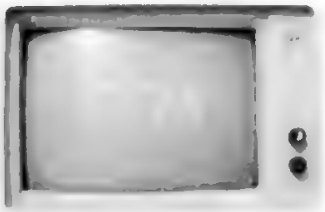
Rentals have been relatively scarce so far. Companies are reluctant to invest in a lot of expensive equipment that could sit idle on their shelves for months, gathering dust and becoming obsolete. And at least some potential customers for short-term rentals may not be considered the most worthy credit risks.

Waters described rentals as "very rare" and said he was unaware of any ComputerLand franchise-holders that offer them. Vincent, whose three ComputerLands don't offer rentals, explained the reluctance of retailers to offer rentals. "One of the typical requests we get is from a Ph.D candidate who needs a system for 6 weeks to complete a dissertation. What am I going to use for security? How would he secure it if he has no money? Do I give it to him on good faith? Hardly." Also, the dealer could end up with a piece of used equipment whose lost value exceeds the income from the rental.

However, General Electric has stepped into the breach, offering rentals of a few days to a year in length. "It's a major thrust for us this year," explained GE marketing manager Edward G. DeMarco. Although GE has been in electronics instrumentation rentals for years, its emphasis has been on the engineering and technical market. But the company decided it was time to get into the home computer field as well. "The market has just exploded," DeMarco said.

GE has the PC, PC-XT, Apple II, IIe and III, and Hewlett-Packard HP85 and HP86, with other models expected, at seven cen-

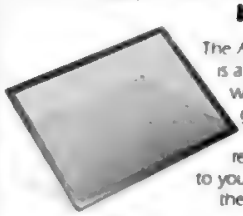
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ters around the country: Schenectady, New York; Fairfield, New Jersey, (serving the New York City area); Atlanta; Houston; Los Angeles; Chicago; and Detroit.

One GE customer is a private school in New York City that gives students an introduction to personal computers, DeMarco said. The school gets the systems for 5 days at a time, "and it's cheaper for them to rent than to buy." Another client is a software house that uses rental equipment to develop software for industrial use on PCs.

Not surprisingly, a rental is more expensive on a monthly basis than a long-term lease or a direct purchase. The shorter the rental period, the more you'll pay proportionately. The base monthly rental for a PC with 64K and one drive is $250. A monochrome monitor with adapter will cost $90, while an Amdek Color 2 monitor with color/graphics adapter is listed at $130 a month. The monthly rate for most software packages runs from $20 to $70. For $625 a month, GE will put together a system that includes a PC with two disk drives, an Epson MX100 dot matrix printer, an Amdek Color 2 monitor, and a software package with word processing, accounting, and business analysis capabilities.

GE offers standard discounts based on the length of the rental. For example, there's a 10 percent deduction off the list rates if you rent for at least 3 months. The discount climbs to 20 percent for a 6-month rental and 40 percent for a 1-year rental.

You can also rent for less than a month. If you keep the system for fewer than 7 days, you'll be charged half the monthly rate. The bill is 80 percent of a month's rent for a 7-to-14-day rental; you'll pay for a full month for a rental of 15 days or more.

GE OFFERS standard discounts based on the length of the rental.

One major difference between a rental and a lease or purchase becomes apparent when a system needs maintenance or repairs. While these are your responsibility with a lease or purchase, GE takes care of them for rental equipment. Another difference is the purchase option, which is generally standard in a lease but may be negotiated with a rental. With a GE rental you can choose, when you sign your agreement, to apply a percentage of your rent payments toward the purchase price.

Some retailers are expressing concern about the competition from rental firms, although Waters said, "So far it hasn't hurt. The stores always have the option to rent if they need to. It's one way they have to compete."

How To Borrow

To buy your PC outright, it may be necessary to borrow part of the purchase price. If so, time spent shopping around for the most favorable interest rates and repayment terms could save you money.

When asked about interest rates for a personal loan that would be used to buy a $5,000 to $7,000 home computer system, loan officers at several banks quoted annual fixed rates of 15.75 to 19 percent for periods of 2 to 4 years, (subject to change). These rates allow for more flexibility than is apparent at first.

One bank said that the loan would cost us 19 percent, unless we became "preferred" customers (by opening a checking or savings account with at least $1,000), which will entitle us to 17 percent. As a careful consumer, you should consider whether the money you're required to put into a checking or savings account to qualify for the lower rate would earn you more money elsewhere, advises the New York State Banking Department.

Another bank offered a ¼ percent reduction in its regular rate if monthly installment payments are deducted directly from your checking account (thereby letting the bank collect its money sooner). Most of the banks said their rates don't vary by the length of the loan.

For examples of how much you'd pay for installment loans at various rates, Figure 1 lists monthly payment schedules for $4,000 and $6,000 loans over 3-year and 4-year periods. The interest rates are given in ¼ percent increments. By multiplying the number of monthly payments by the amount per payment, you can calculate the total interest you will be paying. For example, a 3-year, $4,000 loan at 16 percent will cost $1,062.68 interest, while the same loan at 19 percent will cost $1,278.32.

In addition to asking about rates and preferences, find out whether the bank will insist on holding a security interest in your computer system. One loan officer said her bank has the discretion to do so. If the bank does use the computer as collateral for your loan, it means the system may be seized if you stop making payments.

Figure 1: Monthly payment schedules for $4,000 and $6,000 loans over 3 and 4-year periods.

MONTHLY LOAN PAYMENT COMPARISONS

	3-YEAR			4-YEAR	
	4000	6000		4000	6000
RATES			RATES		
15.75	140.14	210.20	15.75	112.85	169.28
16.00	140.63	210.94	16.00	113.36	170.04
16.25	141.12	211.68	16.25	113.87	170.81
16.50	141.62	212.43	16.50	114.39	171.58
16.75	142.11	213.17	16.75	114.90	172.36
17.00	142.61	213.92	17.00	115.42	173.13
17.25	143.11	214.66	17.25	115.94	173.91
17.50	143.61	215.41	17.50	116.46	174.69
17.75	144.11	216.16	17.75	116.98	175.47
18.00	144.61	216.91	18.00	117.50	176.25
18.25	145.11	217.67	18.25	118.02	177.03
18.50	145.62	218.42	18.50	118.55	177.82
18.75	146.12	219.18	18.75	119.07	178.61
19.00	146.62	219.94	19.00	119.60	179.40
19.25	147.13	220.70	19.25	120.13	180.19

Ask about late charges, life insurance requirements, and penalties for paying the loan off early. And make sure to get a complete Truth-in-Lending disclosure statement, outlining the annual percentage rate and the total cost of your loan. Depending on your credit-worthiness, the size of the loan and the completeness of your application, the approval process generally takes from 24 hours to a week, according to loan officers.

YOUR company could be another source of an interest-free loan.

If you belong to a credit union, check on loan rates there as well. Members can often borrow at lower rates than would be charged by neighborhood banks.

You can use your credit card to get a short-term, interest-free loan if your dealer will accept the charge card for at least partial payment. Depending on billing cycles, you'll usually gain from 2 weeks to 2 months before you have to repay. You avoid interest charges if you repay by the deadline. Be careful, though. Some retailers impose a surcharge—generally 2 to 3 percent—on credit card sales, which will cost you more than you'd save on a month's interest.

Your company could be another source of an interest-free loan. A certified public accounting firm in Albany, New York, offers loans of up to $2,000 to employees who use the money to purchase microcomputers. The firm told its staff that it believes the home computers will help increase their professional capabilities. There's no interest charge, and the loan is repaid over an 18-month period through payroll deductions.

Write-Off Rights

Whichever PC route you choose—direct purchase, lease, or rent—Uncle Sam and most states can help. In fact, the tax advantages or disadvantages of each option can prove to be the deciding factor when you're ready to buy, lease, or rent.

How you use your system—completely for business, solely for pleasure, or in

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CIRCLE 130 ON READER SERVICE CARD

some combination—affects its tax shelter potential. Further, the tax treatment of your expenses varies, depending on whether you buy, lease or rent.

First, let's consider what happens if you purchase your system outright, for full or partial business use. It doesn't matter whether you do so by dipping into your savings account, by getting a bank or credit union loan, or by borrowing some money from a rich uncle. According to William Bush, a tax specialist with the New York City law firm of Reavis & McGrath, your main benefits are the right to an investment tax credit, the right to depreciate your costs over the life of the computer, and the option of treating up to $5,000 as a one-time business expense. Let's consider these in order.

You are entitled to a 10 percent investment tax credit on the cost of your system, excluding any amount you "expense." (For a discussion of expensing, see "What To Tell The Taxman," PC, Volume 1 Number 9, page 375.) The credit is subtracted directly from the amount you owe the feds. This would amount to a $600 credit on a $6,000 system.

For depreciation purposes, a computer generally has a 5-year lifespan under Internal Revenue Service guidelines. The IRS has set up a schedule for depreciation: 15 percent the first year, 22 percent the second year, and 21 percent in each of the following 3 years.

A rapid write-off provision of the law, known as Section 179, now authorizes you to expense up to $5,000, in a single year, of the cost of business-related equipment. Any amount over what you expense is available for the investment tax credit and can still be depreciated. If your system cost $7,000 and you choose to deduct $5,000 as a one-time business expense, you're entitled to a $200 tax credit—10 percent of the remaining $2,000.

Changes in federal law, which will take effect this year, mean that you will have to make a choice about how to handle depreciation if you take the credit. To keep the full $200, you must reduce your basis of depreciation by 50 percent of the investment tax credit. In this case, this means depreciating $1,900 ($2,000 minus $100) over 5 years. Alternatively, to benefit from the full depreciation, you are allowed only an 8 percent tax credit. Using our example, this means that the maximum $200 credit would be cut to $160, while your depreciable base would remain $2,000 over 5 years.

FOR depreciation purposes, a computer generally has a 5-year lifespan under Internal Revenue Service guidelines.

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CIRCLE 354 ON READER SERVICE CARD

What happens if you lease? Your lease payments are deductible as business expenses for the year in which you pay them. Whether or not you can depreciate depends on the specific terms of your lease. However, you don't get the Section 179 expensing privilege if you lease, according to William Bush.

In addition, a lease does not automatically entitle you to an investment tax credit, although this can sometimes be negotiated with the leasing company. "Since the credit is worth something, it may mean the lease rate would be adjusted accordingly," said Bush.

Computer consultant Luebitz noted that it's up to the leasing company whether you get the credit. "If the lessor takes the credit for itself, it can pass on the savings." You may be able to get your financing rate reduced if the lessor keeps the credit. He added that an investment tax credit is of no value to a business that is reporting a loss for income tax purposes.

Heimlich said American Equipment Leasing customers are given the option of taking the investment credit, and most take it. His firm, however, generally won't give a lower monthly payment rate to customers who don't want the credit.

Rental payments are deductible as business expenses, but do not carry any investment tax credit or depreciation rights.

While federal tax write-offs provide the greatest benefits, you may find similar, if smaller, extra savings if you live in a state that imposes its own income tax. Bush recommends reviewing the federal and state tax ramifications of your contemplated purchase, lease, or rental with your own accountant, lawyer, or other tax adviser.

Even if your system won't be used for business, you still may be eligible for some tax breaks, Bush said. If you itemize deductions on your income tax return, you can deduct the finance charge portion of your lease payments, or the interest you pay on your bank loan.

Short as you may be on capital, the computer of your dreams may still be within reach—and those unwanted relatives can breathe more easily. Assuming that's what you want. If not, a swimming pool is nice to have. Or a new set of golf clubs, or . . . */PC*

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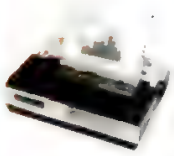
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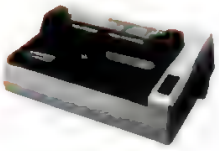
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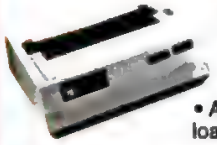
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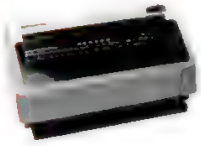
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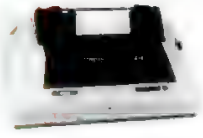
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PC Ventures over the meadow and through the woods to interview the young co-owner of a successful PC mail-order house...

Down By The Old Mill Stream

Down by the old mill stream in Marlowe, New Hampshire (population 500) sits an unassuming little wooden structure. No neon signs mark the doorway, no great expanse of glass exposes an expensively decorated showroom. In fact, the only real clue to the goings-on at 6 Mill Street requires a sharp set of eyes. In the boss's space in the parking lot is a white Saab with license plate "IBM-PC."

Marlowe, whose only other industry is an underused lumberyard, is the home of PC Connection, a mail-order house specializing in software and hardware for the IBM PC. There, in a former mill, is the receiving end of the "800" toll-free telephone line advertised in *PC Magazine* and elsewhere. Out back near the stream is the loading dock where trucks bring in the latest peripherals and take away each day's outgoing shipments.

Recently, PC Executive Editor Corey Sandler visited PC Connection and interviewed David Hall, co-owner (with Patricia Gallup) of the company.

PC Connection was not chosen because it is any better or worse than the dozens of companies offering wares by mail. It was chosen because it was down by the old mill stream.

PC: Tell me about Marlowe, New Hampshire.

HALL: *Well, it has about 500 people, I'd say, and it's supposed to be the icebox of New Hampshire. We were lucky to get this building. The bank had owned it for 2 years, before we got it. There was actually a pond in this room when we took it over. The people here are farmers, loggers, and there are people who work in either Newport or Keene, both about 16 miles from here. There are also a lot of unemployed.*

PC: Do any of them have any concept of what is going on in this building?

HALL: *Some of them work for us. But I don't think there are too many people in town who have computers or even know about them.*

PC: So you don't get much walk-in business?

HALL: *Not from Marlowe. No.*

PC: You got into this because you bought a PC for a company you own called Audio Accessories, right?

HALL: *Yes. Audio makes telephone jacks, miniature and full size, and we sell them to people such as NBC and OpryLand—people looking for a quality jack and who are willing to pay a little bit more for it.*

PC: Why did you feel you needed a PC?



Down by the old Mill Stream. The PC Connection offices are located just off camera in this view of the Ashuelot River. David Hall, kneeling on the loading dock, points to the remains of an old horizontal water wheel.

What was the purpose of the computer in your business?

HALL: *Standard business things like bookkeeping. I'd seen people using computers and decided that we should get one. When the IBM PC came out, it seemed as though it was going to be very popular and would generate a lot of software to support it.*

PC: So you came into the business as a user?

HALL: *Right.*

PC: Why do you limit yourself to selling IBM-related products?

HALL: *We want to offer good support on the things we sell. If we had five or six different kinds of computers, I think the support wouldn't be as good. By limiting ourselves to IBM products, we can know them well enough to answer the questions people ask about them.*

PC: You think IBM products are sufficient to sustain you?

HALL: *Right now they are. Many new mail-order companies are starting up, and they'll probably cut into some of our business, but we're not trying to be a multimillion-dollar company. It's just a comfortable thing to do, and unless the business fades out we'll just stay with IBM. We're making some money. Last year was touch and go, but this year we are okay.*

PC: Why should a PC user buy something from you rather than going down the street to a ComputerLand?

HALL: *If ComputerLand gives them the service they want, they should buy it there. If they want to save some money, then they can try mail order. I'm sure a lot of the ComputerLands out there are doing a good job of support. Some of the people we speak to are calling us because they didn't get support from some local retail store. On the other hand many people will buy only locally at retail stores because they didn't get the support they expected from mail order.*

PC: What do you do to help the consumer?

HALL: *I hear this word support and I don't really know what people are looking for. If someone wants us to take him through every step of 1-2-3, that's a lot to ask. If they call here, we help them as much as we can. Let's say someone buys a board, gets it home, and then realizes he doesn't know what he's doing. If he calls us on the phone, our technical man will step him right through the whole installation, tell him how to set the switches and make sure he's happy. That's my idea of support.*



The distinctive license plate on David Hall's car, here parked by the entrance to the PC Connection offices.

PC: What kind of an inventory must you maintain? Do you keep on hand most of the things you offer, or do you have to order from other sources?

HALL: *We generally stock a good supply but we sometimes run short of certain things such as disk drives. There's a big demand for them, and they've been difficult to get.*

PC: What kind of a person buys from a mail-order operation? Are they more knowledgeable? More adventuresome? On a tighter budget?

HALL: *All different types. Sometimes it's someone who just wants to try it. They've bought a PC and they read about mail order and have seen our ads. They'll buy something small to see how fast it gets there and how good the service is. Some businesses need a dozen multifunction boards, and they'll come to us for price. I think it's just all different types.*

PC: Do people call up prospecting for information rather than to buy?

HALL: *Yes, sometimes. Someone once called and asked if a particular product could be used with one disk drive. We were a little unsure of that and asked him if he had contacted the manufacturer. He said he had, but the manufacturer was unsure of it too.*

PC: What about service and warranties? If I buy a disk drive from you instead of from the IBM Products Center, what can I expect when the head crashes?

HALL: *Anything you buy from us we guarantee for 30 days. But if you buy a disk drive from us and 49 days from now it malfunctions, we'll still take it back. After a long period, you have to pay a fee to have something like that repaired. Ninety days is typical warranty period on the Tandon drive. This is the same as IBM offers. It's still cheaper to pay for the repair than to pay for a service contract.*

PC: Suppose I buy a board from you, and it just doesn't do what I want it to do. It's not broken, I'm just not happy with it.

HALL: *You can always send it back.*

PC: How often does that happen?

HALL: *Probably about once every 2 days someone will return something he decided he just didn't want. I've come to expect it. It's understandable.*

PC: What about software? If someone calls up on the phone and says, "I want a word processor," and you send him a product and he just doesn't like it, what can you do for him?

HALL: *We try to avoid selling someone a product if he isn't familiar with it. If someone calls up and says, "I want to buy Volkswriter," and we send it to him, there's really nothing we can do once he's broken the seal. Depending on the circumstances, we might take software back on a credit basis, but generally speaking, if someone buys software and opens it, he owns it. The most we can do is warn our customers before they buy, which we always do.*

PC: So you're hinting they should go down to their computer store and look at it.

HALL: *I was hinting that they go down to their Users Group and talk about it.*

PC: What do retail computer stores think of your operations?

HALL: *One store manager said that he thought that mail order fits a certain niche. Certain people are going to buy from mail order who wouldn't buy from retail. He didn't feel we were competing with him. Other stores, I'm sure, do object because they regard mail order transactions as lost sales.*

PC: What are your principal costs of operation? How much does it cost to have an incoming "800" phone number?

HALL: *It's fairly expensive.*

PC: Several thousand dollars a month?

HALL: *Yes, about that. And advertising, of course, is a big expense. Incoming freight, outgoing freight. Our outgoing freight charge is just a flat $2 for anything*

other than a heavy item such as a monitor, drive, or printer. So if someone buys 16 pieces of software it still costs him only $2.

PC: You must have put a bit of bulge in the United Parcel Service route here in Marlowe, I imagine.

HALL: *I think they're still driving the same van, but with Audio and PC here together, they occasionally have to make an extra trip for shipments.*

PC: When someone calls Marlowe, New Hampshire, who answers the phone?

HALL: *Could be me, could be one of the salespeople, could be one of the girls in the office.*

PC: If I call up and tell you I'd like to run laboratory instruments with my PC using an IEEE-488 output and I'd also like to have an articulated robot arm, am I going to get someone who's going to say "huh?"

HALL: *In a case like that, we generally suggest that they call someone like Tecmar. That's a little out of our area. We sell to people who are looking for standard software packages and more-or-less-standard products.*

PC: How would you suggest that someone go about choosing a mail-order house?

HALL: *If I was going to buy something by mail order, I would make a few trial purchases of some small items and see what happens, and then narrow it down that way. If you're going to buy one thing, your're more or less hit or miss, but if you're going to spend $1500 to $3000, buy a couple of things from a couple of places to see what the service is like. Call back for some support on something. Call and ask questions and see what the people know.*

PC: What about checking the Better Business Bureaus?

HALL: *Yes. People have called here and asked for our bank references. A lot of people call us on the recommendation of friends. But, it's a good idea to check with the Better Business Bureau if you're concerned. Most people don't seem to be that concerned, though. I think if they see you advertise for a period of time, they feel more comfortable.*

PC: Obviously, advertising is critical for a mail-order house. What is your advertising philosophy?

HALL: *We want to focus on the fact that we deal only with the IBM, so that when somebody orders something from us for his IBM, he knows he's not going to wind up with an Apple version.*

PC: What happens if someone calls you up and says, "I see "Super Duper Calc" advertised at $350, and you're selling it for $351." What's your reaction to that type of call?



Audio Accessories and PC Connection share space at 6 Mill Street. Here, David Hall, taking care of business for Audio Accessories, examines a plug-in board for audio devices.

WE WANT TO focus on the fact that we deal only with the IBM.

HALL: *Well, I can understand someone trying to get the best price that he can. Usually when we offer a price, it's the price that we can give them, and generally there's no room for negotiation. Everyone in the mail-order business seems to have a few things that he can buy cheaper than anyone else. I'm not sure why. Either he's buying a large volume or buying through someone else who's got a good discount. Sometimes we'll suggest, "Go to them and see."*

PC: The general range of prices to a retailer from a wholesaler is about 40 percent off list price, is that about right?

HALL: *Correct.*

PC: So all mail-order houses are in most isntances paying about the same price?

HALL: *I think the larger mail-order houses are paying less. When they've been in business for a while, they can negotiate with either distributors or the manufacturer and commit themselves to a large volume for a longer priod of time. That gives them a little bit of an edge.*

PC: Have you ever shipped a color monitor in a well-padded box and had it arrive squashed down to the size of an envelope?

HALL: *Not too often. But once we sent a game to Canada, and it came back crushed to just about half size. For some reason, it was returned before it even got to the person who ordered it. Most deliveries seem to be handled pretty well by UPS.*

PC: Have you been offered products that you just refuse to sell?

HALL: *Well, no one has offered us any, but there are products out there that we would refuse to sell.*

PC: Are there boards out there that don't work?

HALL: *There have been. I don't think there are many now. It isn't a question of the quality of the product; it's what the product is. There are a lot of software products with nothing behind them that we couldn't sell because people wouldn't be happy with them. Hardware-wise, if it's something new from some new company, we'll check it out. If it looks good and if it seems to be well-planned we'll sell it.*

PC: There are some mail-order houses that sell PC computers they've obtained through the so-called "gray market," without IBM's authorization. PC Connection does not. But, should a wise consumer consider buying a complete computer set up through the mail?

HALL: *That's really a personal decision. I think that if I lived in a town and wanted good support and I didn't know much about computers, I would want to buy the computer from my local store. But I think some people go to their local stores only to find that they know more than the salesman. That discourages a lot of people. Besides, there's not that much that goes wrong with PCs. We haven't returned any of ours, and we've had some of them for over a year.*

There is a risk. It seems as if the more a person is concerned about what's going to happen, the more likely that person is to have a problem. I don't know why.

PC: Do you know of any instances where a second-party manufacturer puts out a board that is vastly superior to the IBM product?

HALL: *No.*

PC: An async board is an async board?

HALL: *Yes.*

PC: And a parallel port is a parallel port?

HALL: *Right. That's about all there is to it. But let me tell you about one manufacturer who makes a board that has two output pins missing on the async board, pins that may never be used. But another manufacturer has included them, and he's pushing his board because it has all the things IBM has.*

PC: Do people ever want to buy things that are silly or just unnecessary? For example, has anyone wanted you to help him put a million bytes of memory in his machine for games and word processing?

HALL: *Not quite that bad. We do get people who ask for software that isn't really what they want. If someone asks for a product we'll try to find out what he is trying to do and make a recommendation.*

PC: If someone were to call up and say, "I'm about to buy a bare-bones PC and build it up," what would your advice be?

HALL: *Well, if he wanted to build it up to a reasonable level, first of all, we'd suggest that he not buy a single-sided drive. I think it's a waste when for just another hundred dollars or so he can get a dual-sided drive. We'll ask him, first of all, what he's going to do with the machine. Almost everyone wants a multifunction memory board of some sort. We'll try to steer him to one that's right for him. Another thing people ask about is chips. Some people want to have ceramic chips. They've heard from their friends that you've got to have ceramic chips! If they want them and we have them, we'll be happy to sell. Ceramic is slightly more expensive. I always tell them, "You know we keep track of how many bad chips we've gotten since we started business. We have four bad chips on the shelf out there, three are ceramic and one is plastic."*

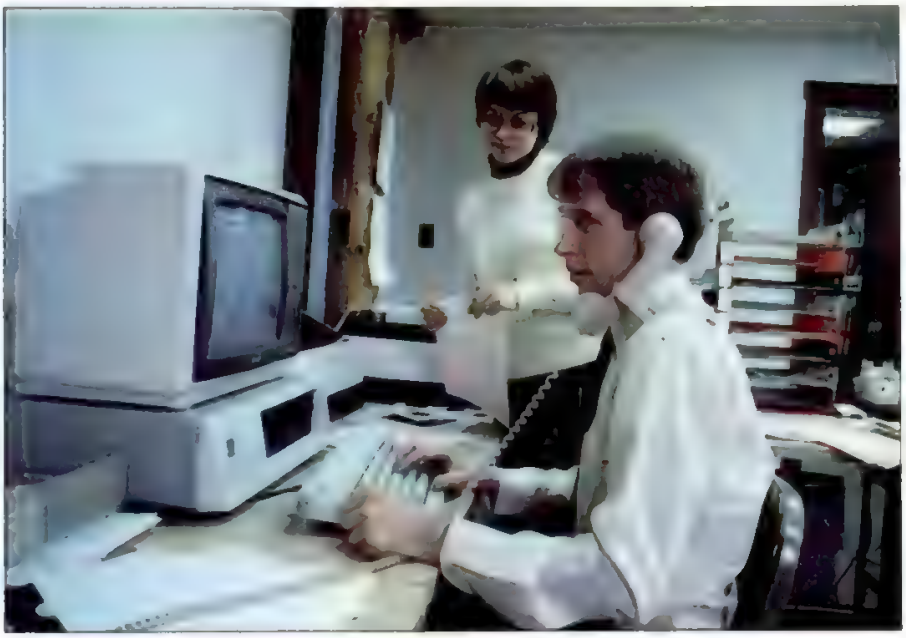
SOME MAIL-order houses sell PC computers they've obtained through the so-called "gray market."

THERE ARE people who think that we're the best mail-order company and there are we're the worst.

PC: You talk a good line about your own company. But, some people believe that there are mail-order operations that are not honest, well-run operations.

HALL: *I think there are very few mail-order places that will take somebody's money and deliberately steal it. But we hear all kinds of stories. There are people who think that we're the best mail-order company they've ever heard of, and there are people who think we're the worst. We try to keep the latter in a rare minority.*

A list of computer mail order houses follows this article. */PC*



David Hall logging in a phone order with the help of one of the office PCs.

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CA: (800) 622-0678
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Micro Computer Accessories, Inc.
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PC Link Corp.
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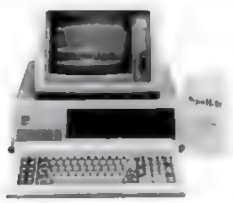
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CIRCLE 146 ON READER SERVICE CARD

MARKETPLACE/LISA HARBATKIN

Buying and selling computer products isn't as simple as black and white. Are discounts from "unauthorized" dealers worth the implied sacrifice in service and warranty? Could be . . .

The Gray Market: Shady Middleman Or Sterling Friend To Consumers?

"Unauthorized" sounds kind of, well, unauthorized. Not sanctioned, not quite legitimate, maybe not on the level. Something to stay away from.

"Gray market" sounds even less authorized than "unauthorized." Just a few shades away from "black market."

But there's nothing illegal about the booming computer gray market. Its existence is obvious, and its product supply sources are an increasingly open secret. It's all legit and aboveboard.

Most dealers handling computer lines on an unauthorized basis would agree with the one who contended that "what we do is only shady as far as IBM corporate goes." Many insist that, in terms of product availability, maintenance, and other back-up services, they do just as good a job as any authorized dealer can.

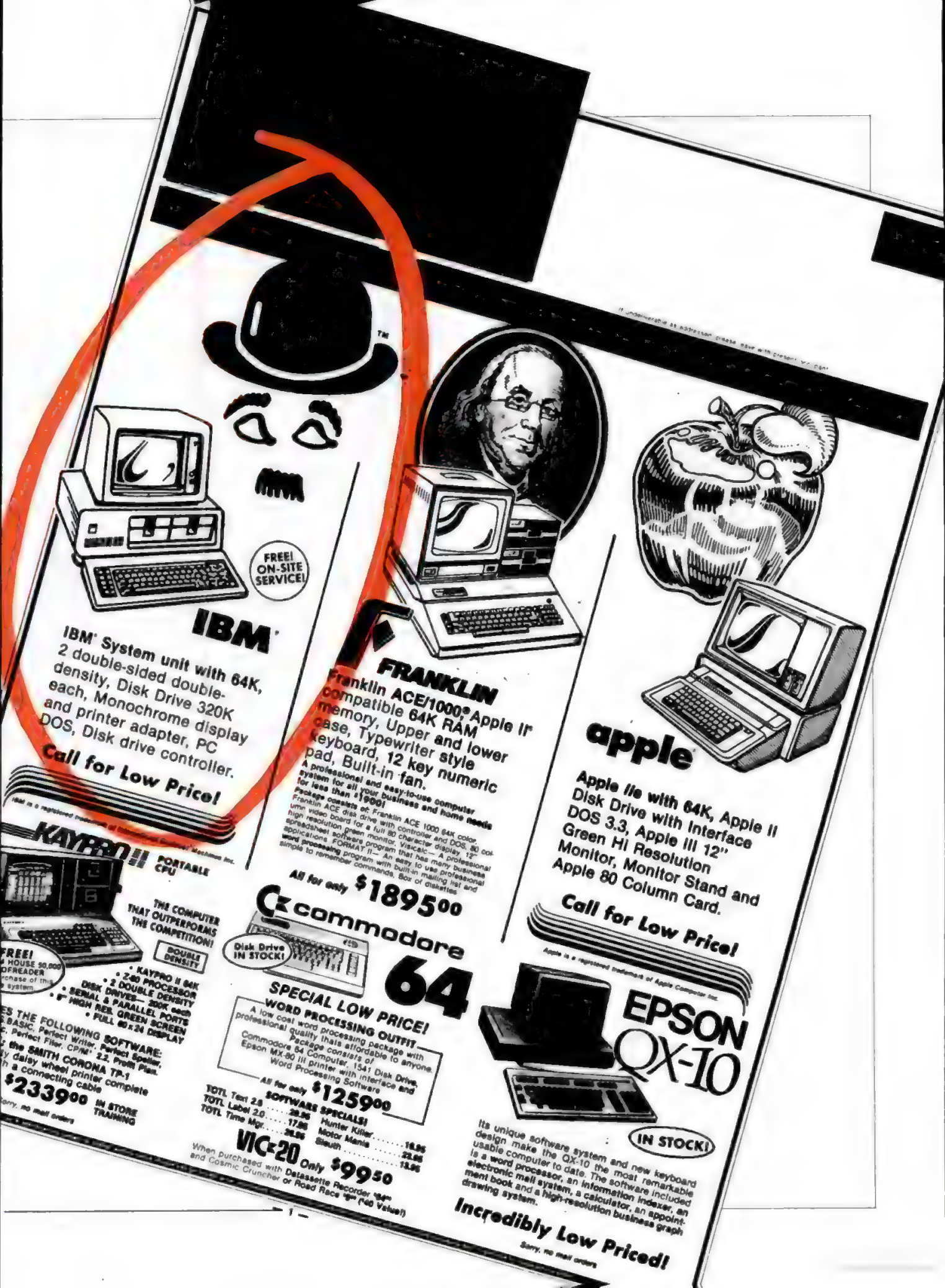
Indeed, for a while after the XT came out, nearly the only store in New York City that could supply it was an unauthorized dealer, 47th Street Photo. And one West Coast dealer who sells via the mails noted that his operation allows "a lot of people in remote areas to buy the machine even though they're not near a dealership."

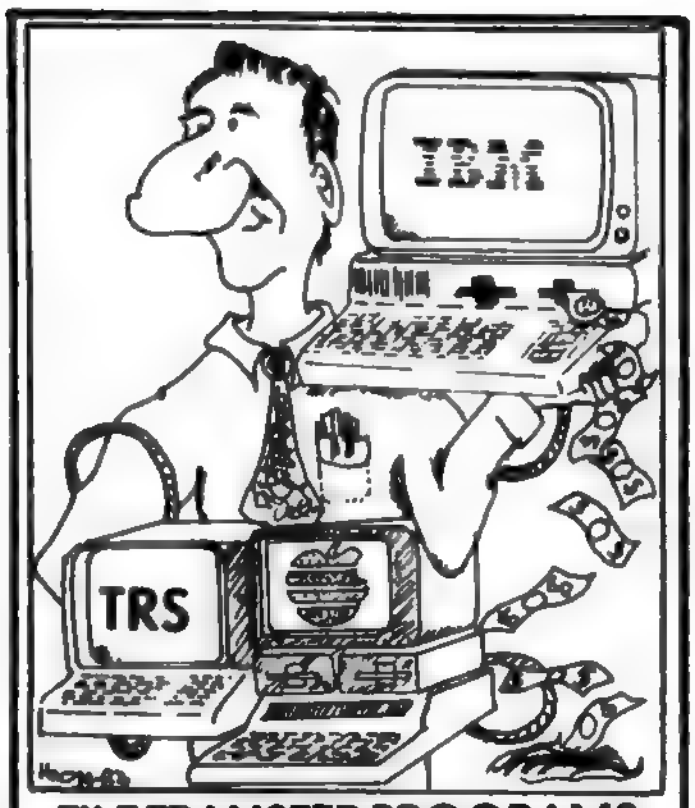
Tracking the Suppliers

Where do the gray market dealerships get their products? Mostly from other, authorized retailers; and this includes the IBM Product Centers in the case of IBM equipment.

In fact, IBM would probably deny it officially, but when we jumped into the phone booth and changed into undercover consumer, we talked to a service rep who said, "there are a lot of (unauthorized) dealers who are buying their machines from us. If they buy in large quantities they can get good prices."

Some unauthorized dealers are shy about exposing their suppliers, especially their current sources. "We wouldn't want to say where we get them," said Bob Webster, half-owner of American Small Busi-


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ness Computers in Pryor, Oklahoma. "We have several sources." In the past, Webster said, "we have bought some from IBM and the Sears Business Centers."

In New York City, Brian Glasser, a popular figure at local PC users' groups, and owner of Greenwich Village Computer, said "I used to be the Fifth Avenue Product Center's biggest customer."

Glasser's sources also include authorized retailers who need cash and order for him. "We pay cash up front," he said. Glasser has some of his bigger customers, including universities and banks, buy the basic IBM machine. "Then we populate it up for them. What we're selling is system enhancement."

Most manufacturers' contracts include clauses forbidding transshipment. But in practice, the computer makers can't really stop the steady stream of goods from the authorized stores to the product-hungry resellers. Some of the stores may actually not know that they're moving machines into the gray market; after all, anyone who walks into a store can buy what he's got the money for. Certainly it would be difficult for a manufacturer to prove that the store knew where the merchandise was going.

Usually, the authorized retailers sell to the unauthorized ones to help clear out unsold inventory and get some immediate cash flow. They may also deliberately place larger orders than they actually need: they can resell the extra supplies to an unauthorized store, with both dealers getting the benefit of the discounts that come with high-volume orders. Some unauthorized dealers operate on a smaller scale, buying a few machines and peripherals and designing systems for customers on what amounts to a turnkey basis.

The unauthorized shops worry about IBM and other manufacturers cutting off their supplies by shutting down the transshippers. They know they have to advertise to get customers, but the idea of an article upset some of the people we tried to talk to. "The quieter we are, the better," one said. But there are risks for the computer makers in any crackdown.

Guerilla Warfare

For one thing, there's the chance that dealers whose contracts are canceled for violating the transshipping clauses might counterattack by charging the manufacturers with restraint of trade. IBM, after its various monopoly battles of recent years, is probably well aware of the risks involved in confrontation.

If the computer makers were really serious about cracking down, their likeliest course of action would be to discontinue volume discounts. So far, no company has shown any interest in doing that. Most manufacturers would probably prefer to continue the current state of guerrilla warfare, invoking less drastic measures.

Why? There's the sheer size of the gray market, and the computer market as a whole, to consider. Shutting down any authorized dealer is shutting down a sales channel. Shutting down the gray market dealerships also means a significant loss of sales.

No one really knows how many unauthorized dealers in the United States are selling the IBM PC and equipment from other manufacturers; most likely, there are at least a hundred of them. Whatever the number, they account for hundreds of millions of dollars in sales at the retail level. This is a significant share of a market which is rapidly nearing $7 billion.

In short, as one of the unauthorized PC dealers put it, "they have good reasons not to stop us from selling their machines."

So Why Aren't They Authorized?

If these dealers do so much business for the computer makers, why aren't they authorized? The reasons vary with the dealership and the manufacturer.

IBM has set stringent financial, training, staffing, maintenance, and sales approach standards as conditions for getting a PC contract. In its first retail venture, the company is anxious to provide a high level of end user satisfaction, which it feels is most assured by requiring a high level of

THE COMPUTER makers can't really stop the steady stream of goods from the authorized stores to the resellers.

dealer performance.

Some dealers can't meet the financial standards IBM has set for granting a dealership. Others may not have adequate staffing. And anyone selling mail order is out, since IBM demands face-to-face contact between customer and salesman. There are even requirements dealing with store appearance.

Brian Glasser is pretty sure that his Greenwich Village Computer decor would not satisfy Big Blue's idea of interior design. "We don't have a real floor—it's underflooring, with no tiles. Until we expand we won't be able to do much with decor." Half-jokingly, he added, "We have the name 'Greenwich Village' and we live up to it." Glasser is equally skeptical of his ability to meet IBM's capitalization requirements, even though he does about $3 million a year in sales.

But many of the larger unauthorized dealers could certainly meet the finance and store set-up requirements, and some have actually applied to IBM for the PC contract. The biggest hurdle most face is their mail-order business, and many question IBM's position on this.

"They're wrong in certain ways regarding mail order, but then there's a lot being done wrong," one unauthorized East Coast dealer said. "IBM worries about us not providing the services a regular store would provide," another mail order dealer said. "But not every store is teaching the customer to really run the computer."

SOME DEALERS can't meet the financial standards IBM has set. Others may not have adequate staffing. And anyone selling mail order is out.

Actually, suggested Bob Webster at American Small Business Computers, there's a kind of self-selection process going on. "Most people who buy from us know how to use the machine. They know what they want in equipment; they want the cheapest price, and they don't need support. Most people who don't know what they want will go to an authorized dealer and get the help." Webster has applied to IBM for authorization. "If we get it we'll stop the mail order business immediately," he said.

Low prices are one of the main attractions offered by some unauthorized dealerships, especially the mail order houses. They can sometimes charge 10 percent or so less than many authorized outlets.

But not all, perhaps not even most, of the unauthorized stores are that much cheaper. Glasser, for example, is adamant on that: "we do discount, but not excessively. And we don't discount IBM pieces as such. We discount a total package consisting of IBM and other equipment."

Risky or Respectable?

Even when there are substantial price differences, some people don't feel secure enough about their computer literacy to buy from unauthorized stores. One recent PC buyer bought from an authorized dealer because of his worries on that score, even though he could have, in this case, saved a considerable sum at a nearby unauthorized store. Eventually he needed help getting a program to run. The people he had bought from gave him no problem. He came to realize, however, that all they did was call the software writer—something he could have done on his own, and in fact did. By the time his problem was solved, he had put as much into the effort as the dealership had.

Which, of course, is part of the point many dealers make, whether they're authorized or not on particular equipment.

"If people want to learn computers, they should use them," one dealer said. "Everybody learns from his own mistakes," said another. "Our people learned all the machines we sell without going to classes. They helped each other."

The manufacturers, in supporting their contract dealers and attacking the gray market, do emphasize the need for support and maintenance. When people at the IBM Product Centers were asked whether it was "safe" to buy from particular unauthorized stores, quite a few of them reacted very negatively.

One service rep at IBM did say he didn't think there'd be any problems, and that he hadn't heard of customers having difficulties at a particular store we mentioned. But salespeople at different Product Centers insisted that the unauthorized outlets weren't providing support, were supplying the wrong cables and peripherals, or worse. "They're selling the box that says IBM with other people's memories and peripherals!" said one.

MOST PEOPLE who buy from us know what they want; they want the cheapest price, and they don't need support.

But so do many authorized dealers. There are many boards out there that are cheaper than IBM's, that do more and take up less space in the machine. And names like Tandon and CDC have become pretty standard in disk drives.

"A person can't put together the best possible system from IBM parts only," said Glasser, who specializes in PCs and PC compatibles and work-alikes. "There's always something weird, something different, something that IBM doesn't make, or doesn't make quite as well."

Training the Gray Marketeers

A growing number of the unauthorized IBM dealers have begun providing maintenance and training. It's not always internal, so it doesn't meet IBM specifications, which require technicians in the store. But in many instances it does fulfill the company's intentions regarding support.

Many unauthorized IBM stores offer some kind of 90-day warranty to match the one IBM provides through the authorized dealerships. Some require that the machine be returned to the store.

Readiness to provide support varies a great deal among the many unauthorized retailers—as do standards of pre-sale help and information. But many computer buyers have found this to be true of the authorized stores as well. The buying decision rests with the consumer; most dealers, whether authorized or unauthorized, would say this decision should be based on after-sale support and maintenance as well as on price. */PC*

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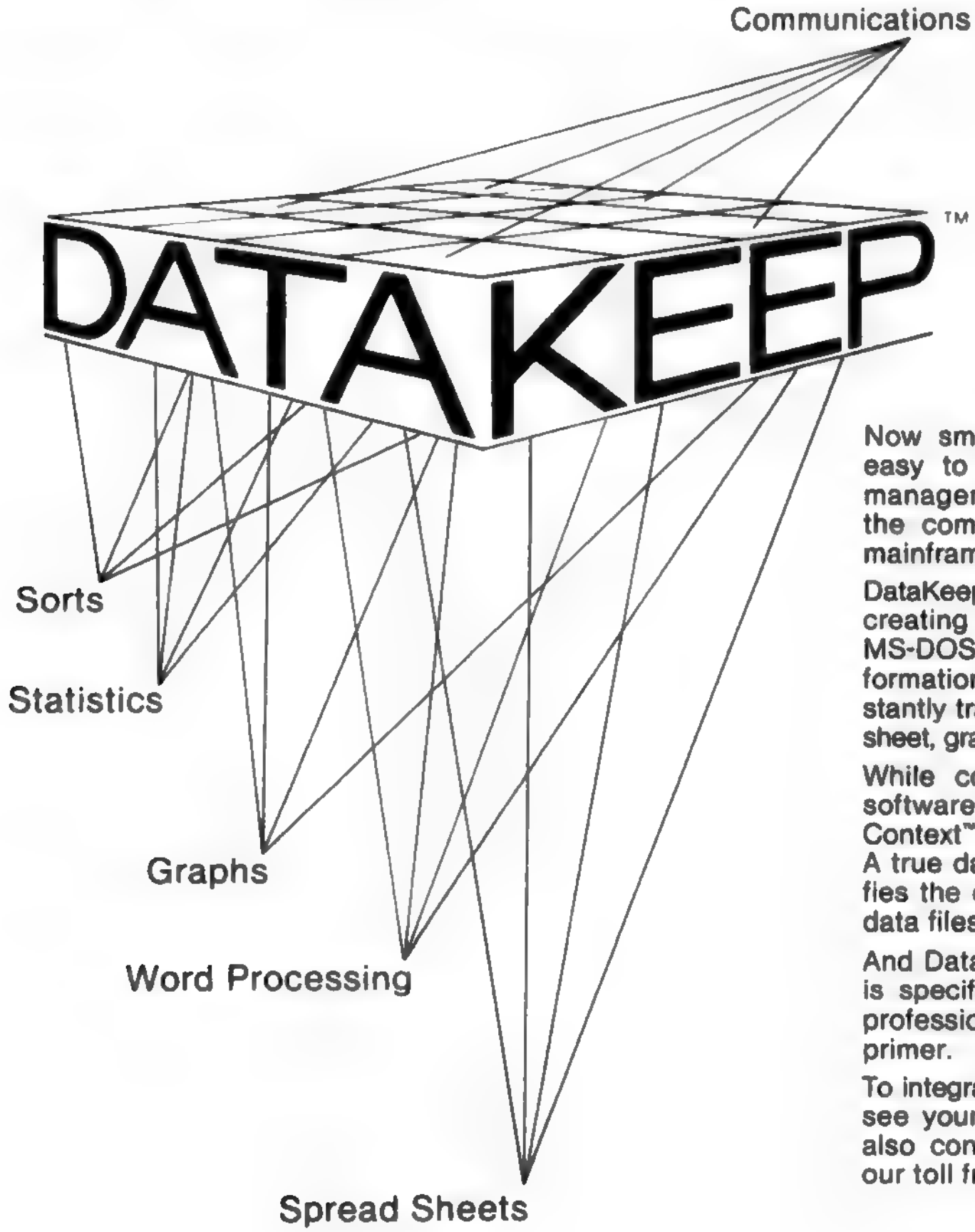
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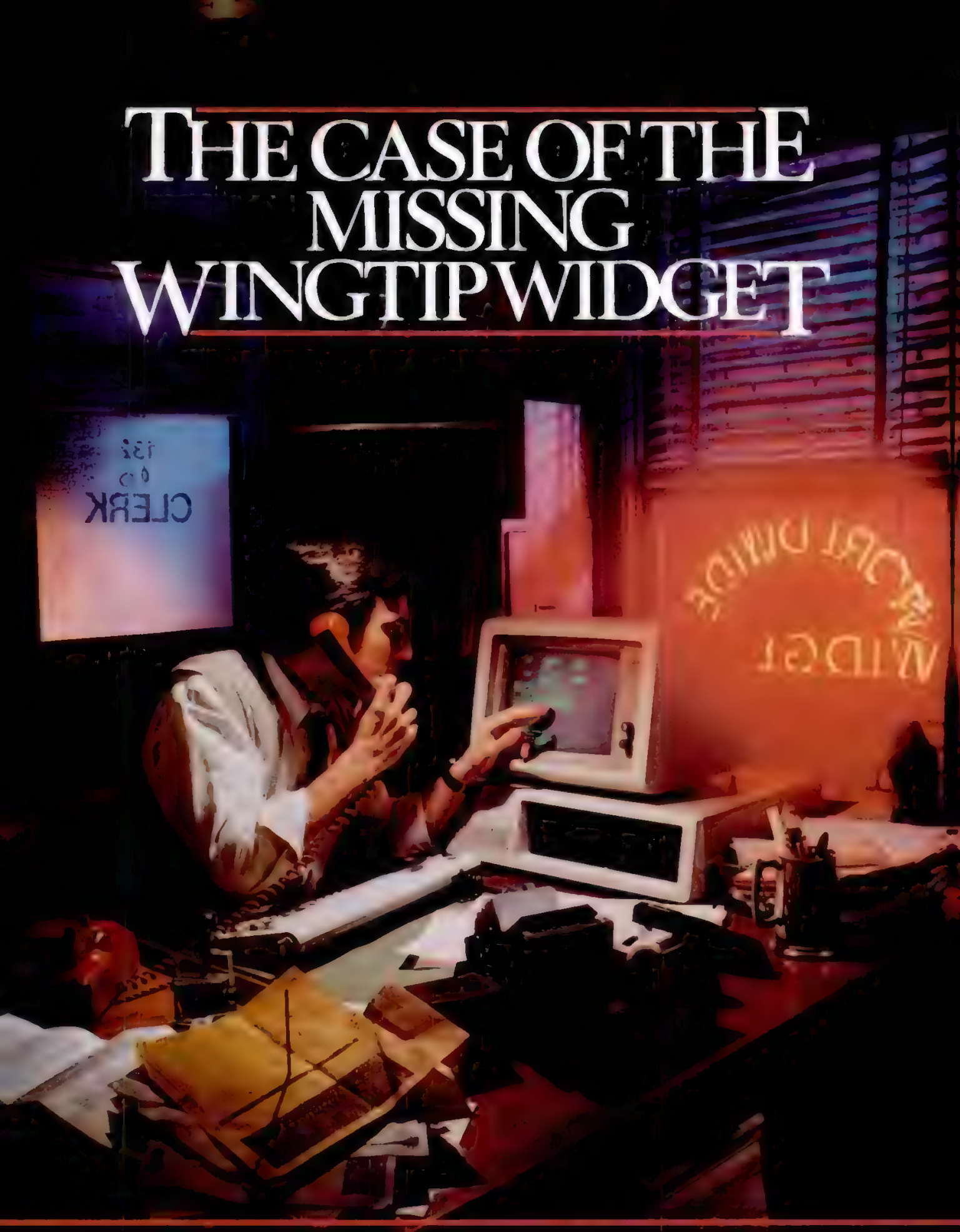
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THE CASE OF THE MISSING WINGTIP WIDGET



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Solved...with the simple genius of the RL-1 Relational Database.

The night clerk's digital watch showed 2:35 a.m. when the red desk phone interrupted his inventory updates at the IBM PC. It was a double ring. An outside call. Williams sensed trouble as he punched line 3.

"Worldwide Widgets, Williams here."

"Walla Walla Widget Works," came the reply. "One of our widgets went."

"What type?"

"Wingtip."

Williams winced. Worldwide hadn't made a wingtip widget since way back when.

"We wouldn't have a wingtip widget at Worldwide, Sir. They're obsolete."

"If we don't get one by Wednesday," the voice wailed, "we're wiped out."

There was one chance. The RL-1 Database Management System. If he could track down the last time a Washington dealer had ordered a wingtip widget...

Williams was no programmer, but that didn't matter. Turning to the computer, he put the question to RL-1 in simple English:

```
Select DEALER, QUANTITY, DATE
from INVOICES
where PART EQ "WINGTIP WIDGET"
and STATE EQ "WASHINGTON"
```

Within seconds, Williams had his answer. A dozen wingtips went to Wally's Widgets 6 years ago. But would Wally have any left?

Yes! Waking Wally was well worth it. The last wingtip widget in Wally's warehouse was on its way to Walla Walla.

Who? What? Where? When? Why? RL-1 knows.

Give your micro the power of RL-1, and you'll be able to handle data like a master detective. Without mastering BASIC or COBOL or FORTRAN or any other mysterious language.

Once the RL-1 floppy disappears into your disk drive, you're armed with a complete relational database management system. And that means life at the computer is going to be a lot simpler from now on.

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The secret of RL-1's genius is *data independence*. Instead of locking data into programs, you create *independent* databases. So different programs can use the *same* data. And you can get at day-to-day information without expensive reprogramming. Or wading through reams of redundant data.

Case in point: standard programming packages. Like accounting, for instance, or inventory control. Most are fine for what they're programmed to do. Beyond that, even the simplest questions can leave them without a clue. Whether it's searching through invoices for missing widgets. Or looking for customers with too much debt. Or finding the address of your aunt in Vermont. Conventional programs just aren't smart enough.

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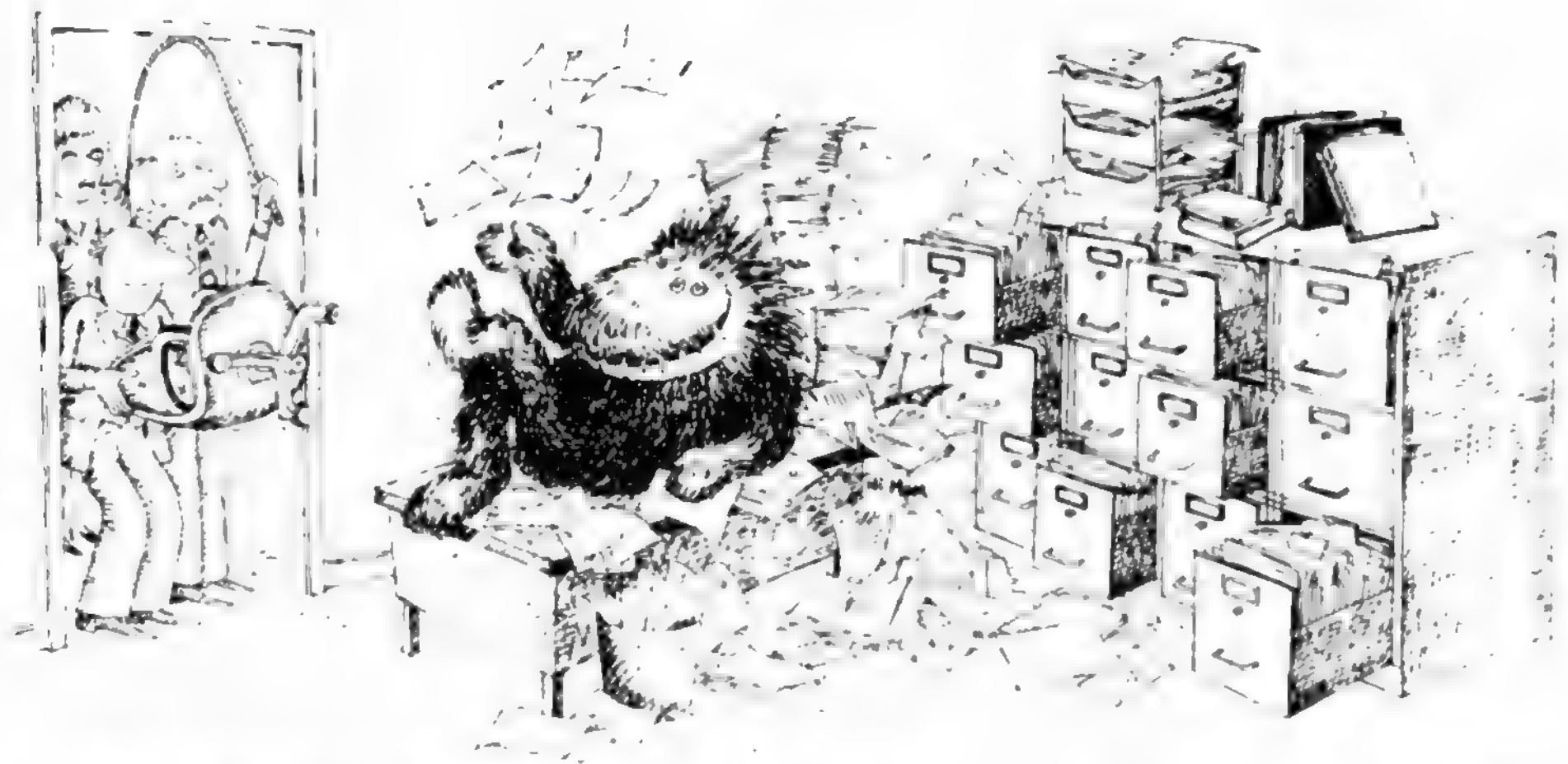
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Dot Matrix Printers

Since an IBM PC can drive almost any parallel printer on the market, software compatability is critical. The larger your software library, the less likely a given printer will work with everything. It's a process of elimination. So if you're just begining, choose software *before* you choose hardware

Remember, too, that *no printer* is 100% compatible with the PC except the PC printer—Epson, Gemini & Mannesmann Tally printers are the next best things, respectively.

EPSON

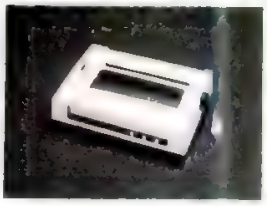
FX, MX & RX



The **MX-80** set new standards for dot matrix printers years ago IBM graced it with their logo. Nevertheless, Epson has reshuffled the product line. The **FX-80**, a Prowriter competitor, features 160 cps, a correspondence font & a new body (tractor is optional). The **MX Series** is being phased out & the **RX Series** will replace it. Call for the latest version & the best prices.

C. ITOH

Prowriter

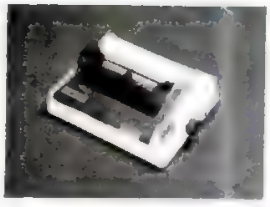


This printer is a major contender. Reviewers laud the **Prowriter**'s speed (120 cps), the buffer (1.5K), character sets (5 fonts) and graphics (160x144 dpi). It's the printer of choice for several major OEMs. The **Prowriter 2** has the same specs, but in a 136 column format. Because delivery is slow nationwide, the **Prowriter** has become "The Printer Worth Waiting For..."

Prowriter **$399.88**
Prowriter 2 ..... **$734.88**

STAR MICRONICS

Gemini 10/15

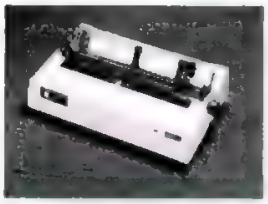


Gemini printers have been getting a reputation—a good one. At 100 cps, with 120x144 dpi, 5 fonts (w/italics) and a 2.2K buffer, it's a match for both the Prowriter & the Epson (it's Epson code compatible, too). **Gemini** comes with tractors & uses plain spool ribbons. The **Gemini 15** is the 136 column version.

Gemini 10 ..... **$339.88**
Gemini 15 ..... **$499.88**

OKIDATA

Microline Series



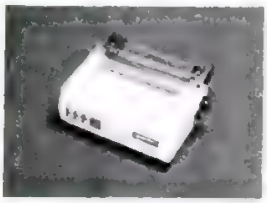
We use these printers in our offices. **Microline 82As & 83As** are data crunchers with 120 cps and optional dot-addressable graphics ROM.

The **Microline 92** & **93** are text processors with 160 cps draft mode, a 40cps correspondence mode & the graphics included. The **Microline 84** combines full graphics & speed (200 cps) with exceptional performance (we use the 84 to print our invoices).

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82A/83A Okigraph ROM **$49.88**
Microline 83A **$679.88**
Microline 92 ..... **$524.88**
Microline 93 ..... **$884.88**
Microline 84 ..... **$1024.88**

MANNESMANN TALLY

MT-160 L



The **MT-160 L** is the newest of the correspondence quality printers. It has speed (160 cps), 8 fonts, parallel & serial interfaces, friction/tractor feed, plus menu-driven installation for easy set-up from the control panel.

MT-160 L **$789.88**

We sell other dot matrix printers, including the Anadex Series, Centronics Series & IDS's Prism Series. Call (603) 881-9855 for technical details. For prices, or to order, call (800) 343-0726.

Letter-Quality Printers

Letter-quality printers are business machines, & very high-ticket ones at that. Most individuals should buy a dot matrix first, adding letter-quality when it's needed. If you *must* have letter quality first & foremost, back yourself up with a cheaper dot matrix for drafts: they're faster & the letter-quality printer is reserved for final drafts.

C. ITOH

Starwriter

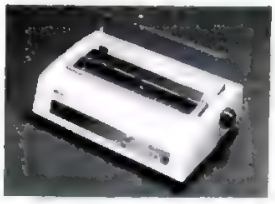


The **Starwriter**, released last year by C. Itoh, has proven a worthy printer. You don't trade-off speed for price or quality. The **Starwriter** uses Diablo code, wheels & ribbons, has a 40 cps print speed, 1/48" line space, 1/120" horizontal spacing—ideal for proportional modes. (For real speed freaks, there's the **Printmaster**, at 55 cps. Same specs as above.)

Starwriter Parallel **$1379.88**
Printmaster Parallel **$1679.88**

DATA TERMINALS & COMMUNICATIONS

DTC 380Z



The **380Z** is a letter-quality printer that rivals and replaces the Daisywriter 2000. It has the 48K buffer, true Diablo emulation & uses the Brother/Daisywriter supplies. The documentation is great, & the **380Z** even has pin-outs on the back for easy interfacing (parallel or RS-232C). Eat your heart out Daisy!

DTC 380Z **$1139.88**

SILVER REED

EXP-550

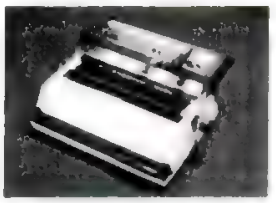


Why buy a Transtar when you can buy from the guys who make them? The Silver Reed **EXP-550** is a 16 cps, 132 column letter-quality printer with *true* Diablo emulation, making it compatible with most word processing software. It's ideal for medium duty office work. Add a buffer & you'll have a versatile printing system.

EXP-550 (Parallel) **$719.88**
EXP-500 ..... **$CALL**

SMITH-CORONA

TP-1



The **TP-1** is an ideal second printer for small offices or homes. The tractor feed (now available) enhances its paper handling. If you're letter-quality needs are light, this might be the machine. (Specify 10 or 12 cpi when you order.)

TP-1 ..... **$CALL**

We sell a variety of other letter-quality printers, including the Diablo 620 & 630, the NEC 3530, 3550 & 7730 Spinwriters, the Qume 11+ & many others. Call (603) 881-9855 for technical details. For prices, or to order, call (800) 343-0726.

Accessories

We carry the accessories below as well as others too numerous to mention, like cables and diskettes. Ask if you don't see it listed.

QUADRAM

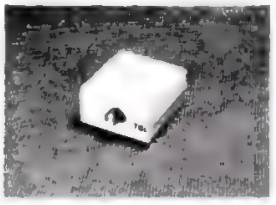
Microfazer

Quadram's **Microfazer** is a stand-alone buffer that can be expanded to 512K—that's about 200 pages. External buffers can be moved from system to system, & they leave your PC memory free. The copy feature lets you print unlimited copies of a document. Comes with its own cable. The power supply is optional.

8K parallel/parallel **$154.88**
64K parallel/parallel **$219.88**
256K parallel/parallel **$629.88**
512K parallel/parallel **$979.88**
9 Volt Power Supply **$19.88**

TBL PRODUCTS

Printer Switch



We finally found a printer switch box that we like. Switch between two printers, in parallel/parallel or serial/serial versions (all female plugs).

2-Way Printer Switch **$119.88**

UNIVERSAL OUTPUT SUPPLY

Printer Paper

Our pin-fed fanfold paper is 20lb white bond, shipped in a sturdy case. There are two sizes: 9½" & 14⅞". The wider paper also comes in green-bar.

Paper (9½") **$44.88**
Paper (14⅞") **$49.88**

HIGH TECHNOLOGY AT AFFORDABLE PRICES

THE BOTTOM LINE

MILFORD, NH 03055-0423 □ TELEPHONE (603) 881-9855

IBM PC COMPATIBLE

64K Chips

We carry 6164s, 200 nanosecond-type memory chips for upgrading your IBM PC peripheral boards. They're sold in sets of nine each, & we have quantity pricing for even bigger orders. We also have 16K chips (9/set) for upgrading the PC's mother board.

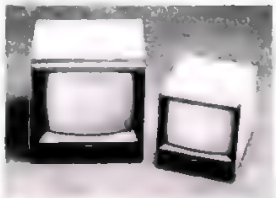
64K Chip Set **$79.88**
16K Chip Set **$29.88**

Monitors

Here the "eye of the beholder" holds against any spec's. Our favorites are listed below. Remember to get the Color Graphics Card, *not* the Monochrome adapter.

USI

Pi Series



We're *still* using a **Pi-3 Amber** that we advertised last summer. The 20MHz bandwidth gives the highest resolution available, & we like the no-nonsense case & controls. Uses both SO-239 or RCA phono jack. Cable is oprtional.

Pi-2 (12" green)..... **$159.88**
Pi-3 (12" amber)..... **$189.88**
Pi-4 (9" amber) **$159.88**

PRINCETON GRAPHICS

HX-12

The **HX-12** is, without dispute, the highest resolution RGB available for the PC. 16 colors (using NEC's tube), 690 dots by 240 lines, 15MHz bandwidth & more. The **HX-12**'s case styling is identical to IBM's. It comes with its own cable.

PGS HX-12 (RGB) **$529.88**

QUADRAM

QuadChrome

The **Quadchrome** has the same spec's as the HX-12, but with the Quadram name. Same price too.

Quadchrome (RGB)..... **$529.88**

We also carry Amdek Colors 1, 2 & 3, Electrohome's 1302-1 & 1302-2 Series, NEC's JC-1203, Quadram's QuadChrome & Zenith's ZVM-121. Call (603) 881-9855 for technical details. For prices, or to order, call (800) 343-0726.

Modems

There's a boom on in telecommunications, and to be part of it you need a modem & software. As with printers, the software determines most things, like support of the modem's features (the "bells & whistles") & the ability to communicate with a given device. *Check things out!* Communications can be a nightmare if you're guessing, & easy as pie when you know what you're doing.

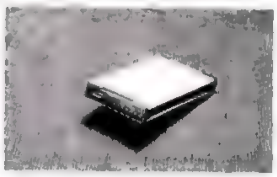
US Robotics **Password**
$379.88 UPS DELIVERED



An exceptional value for a 1200 baud modem. The **Password** is a direct connect originate/answer type modem with 0-300 & 1200 baud capability (Bell 212A compatible). Features include auto dial, auto answer, auto mode and auto speed select, full & half duplex (local echo), DTR override, RS-232C pins 2 & 3 reversible & audio phone line monitor. Single button operation makes the **Password** very easy to use. Comes with an RS-232C cable, power supply & modular telephone cable.

DC HAYES

Smartmodems



The Hayes **Smartmodem** has earned an enviable reputation for quality, reliability & performance. The **Smartmodem** features full/half duplex, auto dial/answer, programmability in any language, English/numeric result codes & either 300 baud (Bell 103) or 300/1200 baud (Bell 103/212). It comes with modular cable & power supply. The RS-232C cable is optional.

Smartmodem (300)..... **$219.88**
Smartmodem (1200)..... **$539.88**

We also carry the Novation Auto Cat & SmartCat Series & US Robotics. Call (603) 881-9855 for technical details. For prices, or to order, call (800) 343-0726.

Expansion Boards

AST RESEARCH

Megaplus

The **Megaplus** uses one slot, but it has one parallel port, two RS-232C ports, a clock and software (SuperDrive & SuperSpooler). Add more memory in 64K increments up to 256K. The **MegaPak**, at 256K, is a piggy-back card.

64K Megaplus..... **$339.88**
256K Megaplus **$499.88**
Megapak 256K..... **$289.88**

I/O+

The **I/O+** has a parallel port, a RS-232C port, a game port, a clock & software, but no memory.

I/O+ **$199.88**

Connect All **$24.88**

QUADRAM

Quadboards



We sell **Quadboard**s because they consistantly perform better than any other board we've seen. They come with 64K & 256K on-board, a parallel port, a RS-232C port, a clock & the software (QuadDrive/Spooler). The **Quad 512+** is a memory board with a RS-232C port. Single function boards are also available. Quadram products are warrantied for a full year.

64K Quadboard **$279.88**
256K Quadboard..... **$429.88**

512+ Expansion

Quad 512+ (64K)..... **$239.88**
Quad 512+ (256K) **$399.88**
Quad 512+ (512K) **$599.88**

Memory Only

64K Memory **$199.88**
128K Memory..... **$259.88**
192K Memory..... **$309.88**

Single Function Cards

Clock/Calendar..... **$89.88**
Parallel Card..... **$89.88**
RS-232C Card..... **$89.88**

QUADRAM

QuadLink

A real breakthrough! **QuadLink** lets you run Apple II/II+/IIe software in the IBM PC. It's like having a 64K Apple computer installed in your PC. **QuadLink** uses standard PC printer ports, monitors, etc. No disk conversion or reformatting required. Takes up only one slot.

QuadLink **$549.88**

MEMBER DIRECT MARKETING ASSOCIATION

Disk Drives

Internal hard disks have only one weakness: they bring the whole system down with them if they need repair. It pays to configure with *two floppies* first, then add a hard disk that can be detached for service if need be, leaving you otherwise operational.

QUALITY COMPUTER SERVICES

Hard Disk

We took our QuCeS Hard Disk Subsystem out of its box, plugged it in, turned the power on & never bothered with it again. These units are rugged, reliable & easily interfaced. It's become a minor legend. QuCeS warranties their hard disk for a full year—an exceptional thing in this business. Comes complete, ready to run.

12Mb Hard Disk..... **$2059.88**
20Mb Hard Disk..... **$2369.88**
40Mb Hard Disk..... **$3539.88**
Big Blue..... **$479.88**

MAYNARD ELECTRONICS

Disk Controller

These controllers fill the bill for anyone building the PC from scratch. The **Maynard Floppy Disk Controller** handles two internal drives (A & B) plus two externals. Comes plain, with a parallel port or with a serial port.

MFD Standard..... **$159.88**
MFD w/parallel..... **$219.88**
MFD w/RS-232C **$259.88**

IBM PC COMPATIBLE

Disk Drives

Tandon is our primary source for drives, but we've used MPI & Control Data without any trouble. We'll use drives of equal quality if Tandon's aren't on hand—same as IBM does.

Single-sided **$229.88**
Double-sided..... **$279.88**

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Orders Only: (800) 343-0726

No Hidden Charges:

We pay UPS ground shipping on all our orders, and we *never* charge extra for credit cards. We accept CODs & add a $10 fee per order. We have a $50 minimum order. Personal checks are cleared in 3 weeks.

All our equipment is shipped factoryfresh, with full warranties. We're authorized for warranty work on a number of printers, & we also offer extended warranty plans for those printers.

Sorry, we cannot accept open POs or extend credit/terms at these prices. APO and foreign orders are not accepted.

We prepared this ad in April, & prices do change, so call to verify them.

MasterCard VISA AMERICAN EXPRESS

HIGH TECHNOLOGY AT AFFORDABLE PRICES

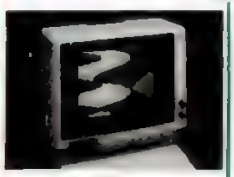
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CIRCLE 152 ON READER SERVICE CARD



NATIONAL COMPUTER PRODUCTS



Video Monitors

AMDEK 300 12" hi-res green . . . 149.95
AMDEK 300A 12" amber . . . 169.95
AMDEK Color I Plus 13" color . 329.95
AMDEK Color II hi-res RGB . 649.95
AMDEK Color III med-res RGB . 379.95
BMC 12AU 12" hi-res green . . 99.95
COMREX 5600 12" hi-res amber 179.95
COMREX 6500 13" color 299.95
NEC 1201M 12" hi-res green . 169.95
NEC 1212M 12" composite color 319.95
NEC 1203H 12" RGB for IBM PC 679.95
NEC 1260 12" green 119.95
TAXAN Vision I 12" med-res RGB 329.95
TAXAN Vision 3 12" hi-res RGB 499.95
TAXAN 12" hi-res amber . . . 149.95
USI 12" Amber display 169.95
ZENITH 12" hi-res green 119.95



PRINCETON PGS HX 12

IDEAL FOR IBM PC!

High Resolution 12" RGB Color Monitor

- 80 character x 25 lines
- 660 dots horizontal resolution
- 16 colors
- Includes IBM PC cable
- Very affordable

PLEASE CALL FOR MORE DETAILS AND PRICE

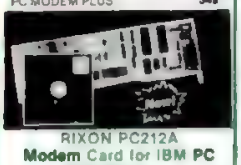


Hayes

HAYES Smartmodem 300 . 219.95
HAYES Smartmodem 1200 519.95

IBM PC Compatible Modems

CACTUS TECHNOLOGY MODEM 299.95
NOVATION J-CAT 300 . . . . . 129.95
ANCHOR MARK VIII 300/1200 299.95
RIXON R212A 300/1200 . 369.95
PC MODEM PLUS 349.95



RIXON PC212A

Modem Card for IBM PC 300/1200 Baud

A professional communication device made by RIXON, a leader in the modem industry. It uses state-of-the-art LSI technology. It plugs directly into the IBM PC, and features an on board serial interface and includes PC COM I the software support package for: dialing numbers from keyboard, storing and retrieving numbers, redial a number (1 to 99 times), enter and exit interactive mode, and many additional features no other modem has.

Mfg. List 595.00 . . . . . **Special 379.95**



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Random House Thesaurus 129.95
MailMerge
SuperSort Only **$169.95**
SpellStar
Call for special package deal pricing.

Popular Software

dBASE II (MS-DOS or CP/M 86) 449.95
LOTUS 1-2-3 Please call for details
PC Tutor by Comprehensive 69.95
Home Accountant Plus 119.95
T.I.M. III by Innovative 339.95
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Peachtree GL/AR/AP Series 4 Pak 399.95
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VisiCalc

Only **$179.95**

VisiFile
VisiTrend/Plot Only **$229.95**
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VisiWord (req. 128K) 299.95



MICROSOFT

Microsoft Multi-Plan 179.95
Flight Simulator 39.95



IBM Personal Computer

Includes 64K, 2 DD/DS 320K drives keyboard, color video card, & MS-DOS. Monochrome monitor by IBM is optional.

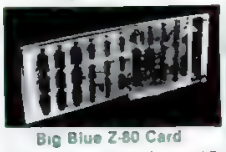
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PC Mouse

For use with IBM, Radio Shack, Apple, etc. System includes Mouse Systems M-1 optical mouse w/pad & RS-232 interface

Only **$249.95**



Big Blue Z-80 Card

Z-80 with 64K, parallel & serial I/O, hard disk interface & clock . . 459.95
BYAD DS1 Z-80 card with software 579.95



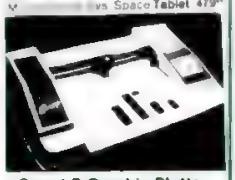
64K Memory Upgrade

Nine 4164 200ns RAM chips 89.95
Nine 4116 200ns RAM chips (16K) 25.95



Miscellaneous

SYMTEC Light Pen 139.95
KRAFT Joystick 59.95
KRAFT Paddles 49.95
[illegible] Space Tablet 479.95



Sweet-P Graphic Plotter

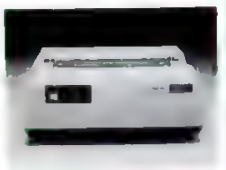
A simple to operate plotter which easily interfaces to the PC using a centronics parallel port. Complete with software, set of pens, paper and operators manual. List Price $795.00
Special Offer 569.95



EPSON FX-80

160 cps 10" carriage, 2K buffer
Epson FX-80 Tractor 39.95

Epson FX-100	Please
GEMINI 10	call
GEMINI 15	for
C. ITOH 8510	our
C. ITOH 1550	low
NEC 8023A	prices

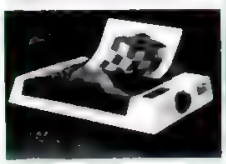


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160 cps, 10" carriage, 80 columns

Only **$499.95**

Tractor for ML 92	59.95
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TRANSTAR 315 Color Printer

Prints 7 colors plus more than 30 shades, all in a single pass of the print head. And it's built by Seiko

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Letter Quality Printers

C. ITOH F-10 Starwriter 40 cps 1359.95
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NEC Spinwriter 55 cps RS-232 serial 1449.95
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NEC 3550 Sprinwriter for IBM PC

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Quadram Quadboard

64K Only **$289.95**

128K 359.95 192K 429.95 256K 499.95

512K QuadBoard

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QuadChrome RGB Color monitor Call
Coming soon! New direct connect



AST RESEARCH INC.

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128K 429.95 192K 489.95 256K 549.95
64K with parallel & serial 419.95
128K 489.95 192K 559.95 256K 629.95
MegaPak option (256K) for 512K total 329.95

ComboPlus

64K with serial, parallel & clock 349.95
128K 419.95 192K 489.95 256K 559.95

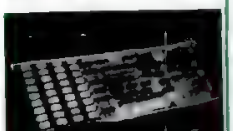
I/O Plus

Serial, parallel, clock, and game adapter port 209.95



Apparat Inc

ComboCard with parallel printer port, Asynchronous communications / RS-232 port, and clock/calendar 169.95
RS-232 cable for combo card . 29.95



Monte Carlo Card

64K 449.95 128K 529.95 256K 649.95



IBM PC Disk Drives

5 megabyte internal drive & p/s 1529.95
10 megabyte internal drive & p/s 1879.95
For external drive model add $300.00

Call for prices on Davong and Rana drives

Tandom TM 100-2 DS/DD 269.95
Trak DS/DD 500K 40 track drive 269.95
Trak 4 drive floppy controller 149.95
Trak 5 megabyte 5¼" hard disk 799.95



Columbia MPC IBM PC compatible system

Includes 128K, two DS/DD 320K drives, 2 RS-232 serial ports, centronics parallel printer port, 8 IBM PC compatible expansion card slots, video monochrome/color/graphics card, and IBM type keyboard.

Please call for price.

Available with winchester disk.

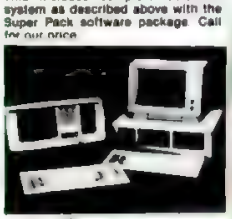
Special Software offer!

The Super Pack includes MS-DOS, CP/M 86, BASICA (w/color graphics, Asynchronous communications support, macro assembler) Perfect Writer, Perfect Speller, Perfect Calc, Perfect Filer, Columbia Tutor, Diagnostics, and HOT LINE Support

SOFTWARE PACKAGE PRICE $295.95

COMPLETE SYSTEM PACKAGE DEAL!

This includes complete Columbia system as described above with the Super Pack software package. Call for our price.



corona.

IBM PC COMPATIBLE DESKTOP COMPUTER

128K, dual 320K disk drives, 9" display, serial & parallel ports, and MS-DOS.

UNDER $2400

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IBM PC COMPATIBLE PORTABLE — PORTABLE

128K dual 320K disk drives, 9" display, serial & parallel ports, and MS-DOS.

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COMPAQ PORTABLE IBM PC COMPATIBLE COMPUTER

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Diskettes

3M Scotch 5¼ DS/DD Box of 10 35.95
Verbatim Datalife 5¼ DS/DD Box of 10 35.95
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We will accept the return of most items within 15 days of your receipt of the merchandise. At your request we will repair, exchange, or issue a prompt refund. Understandably, software is not returnable. Please call for more details.

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National Computers Spring 1983 collection of State-of-the-Art computer merchandise is available now. You'll find hundreds of products, including computers, printers, video monitors, modems, and accessories for the Apple II, IBM PC, and CP/M systems, all at the great prices you expect from us. It includes dozens of illustrations and some very informative comparison charts. For your copy send $1.00, which we will credit to your next order.

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To order please send money order or cashier's check. Personal checks 3 weeks to clear. Prices reflect 2% cash discount. We accept VISA, MasterCard, American Express, Diners Club and Carte Blanche. Shipping, handling & insurance charges add 3% of merchandise total (min. $5.00). California residents add 6% sales tax. Foreign customers please call or write. Prices and availability subject to change without notice. All equipment is new and warranted by the manufacturer.

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ADVPC881

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DEALERS, WE BUY EXCESS STOCK, PLEASE CALL OR WRITE

MARKETPLACE/TODD KATZ

Is the IBM PC a victim of its own success? Or does the current shortage of several key PC components suggest a secret sales strategy?

The Great Five-Point-Two-Five-Inch Disk Drive Shortage

If vendors of computer software and hardware have learned one thing in the past 24 months, it is that once an appetite for computers has been created, the consumer's desire for immediate satisfaction is nearly insatiable. Having scrimped, saved, borrowed and begged to get the required money together, the new computer enthusiast does not want to wait even a few days for full and complete delivery.

Let's Get Sirius

Among early students of this truth were the people who make the Victor 6000 16-bit microcomputers that are sold in Europe under the name Sirius. This high quality machine, which appeared fast on the heels of the first IBM PC, quickly won public acceptance, particularly from computer professionals, who were impressed by its high quality engineering. Disk capacity was considerable—more than 600,000 characters per drive. A hard disk was available. The bit map 600×300 monochrome screen offered the best resolution in the industry at the time, and the keyboard was "American standard," including oversized Shift and Return keys.

In fact, about the only problem facing the Victor 6000 was its unavailability. There weren't enough machines to show and distribute to software developers and publishers. Which meant there were too few to sell. Although the Victor today remains among the better selling MS-DOS systems, the early problem with supply left a breach for Texas Instruments, Wang, DEC, and other Johnnies-come-lately to invade. They are now competing vigorously for the computer hardware dollars not going to IBM, Apple, and Tandy.

The Great Disappearing Disk Drive

Of course, "ramping up for production," as it is called in the manufacturing sector of the industry, is not simple. Pieces of equipment as diverse as computer chips from Singapore and rubber grommets from Ohio must be procured, tested, integrated, tested again, packaged, serialized, stamped, boxed, shipped, and sold. Disk drives, certainly the most complex, labor-intensive and vulnerable component of a Personal Computer, have been in short supply for many months. In such a situation, only the biggest and best could be expected to have the resources to take advantage of widening sales and supply opportunities as they arise.

ABOUT THE only problem facing the Victor 6000 was its unavailability.

Or could they? Is it possible, in fact, that even a seasoned competitor such as IBM is suffering from growing pains? The answer seems to be "Yes." An unofficial survey of ComputerLands and other department stores, including IBM Product Centers, selling IBM PCs found that several key PC components are in very short supply these days.

It comes as no shock that Product Centers are not stocked to the gills with IBM XTs, which were introduced only a few months ago. But disk drives? Monochrome monitors? Serial and parallel printer boards? One would expect that there would by now be sufficient supplies of these plain vanilla, high-profit items to meet what should have been expected to be a rapidly rising demand.

Has IBM misread the market it created? Or has the procurement system that was devised to bring the PC to market early fal-

tered as production demands increased?

It is true that the PC was the first major piece of computer equipment IBM ever designed with major components provided by outside "jobbers." Although IBM will not comment on the source of its components, it is common knowledge that Tandon Corp., for example, is a major supplier of the IBM-labeled disk drives. Epson sells dot matrix printers to IBM. NEC supplies letter-quality printers. Intel supplies chips. Seagate Technology and MiniScribe are said to be supplying the XT's hard disks.

Depending on outside vendors introduced two variables. First, will these suppliers produce equipment in the quantity and quality that IBM and its ever-growing customer base need and demand? Might the demand for these products be so great that the incentive for producing them, in the high volume and low margins IBM insists upon, becomes an unattractive alternative to marketing the same or similar products to other manufacturers and distributors?

IT COMES AS no shock that Product Centers are not stocked to the gills with IBM XTs, which were introduced only a few months ago. But disk drives?

PCs with the standard 64K RAM and a single 320K disk drive remain widely available but in recent months—particularly during April and May—dealers are experiencing increasingly serious shipping delays for disk drives and IBM optional boards. In some cases, back orders are becoming a major concern.

One East Coast dealer, who asked that neither he nor his company be named, indicated that his store was short more than 100 drives. "We can only get machines with a single double-sided drive, and when we order individual IBM disk drives, we are back-ordered." What does the dealer do in such a situation? "We look for alternate sources for drives, such as those manufactured by Tandon, which we can install and sell."

ONE EAST Coast dealer indicated that his store was short more than 100 drives.

Unfortunately, not everyone selling PCs is in a position to seek hardware from outside vendors. In San Francisco, for example, one IBM Product Center employee acknowledged that customers

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were waiting 3 to 4 weeks for IBM PCs in their configuration choice.

Contacted at the Boca Raton IBM PC headquarters a spokesman for IBM confirmed that many PC components are in short supply. "Starting in the last quarter of 1982, demand for the IBM PC has been very high. Consequently we find that we have a shortfall between demand and supply for many of our IBM PC products. We are working very hard to bring supply into line with demand but we have not accomplished this goal as of yet," he said.

Austere silence prevails at ComputerLand Corporate headquarters, where a company spokesperson explained that he could not discuss the situation because, "We have a corporate policy of not commenting on our relationship with vendors."

A Tale of Two Drives

When customers accept a drive from Tandon or another manufacturer, they will usually save more than a few dollars. Typically the retail cost of a Tandon is $150 less than the drive with IBM's logo on it. However there may be other considerations. For example, IBM's extended service contracts are certainly not extended to non-IBM components, and once a microcomputer has passed beyond the critical 100 hours of use, it is the disk drive that is most likely to need attention or replacement.

As a matter of fact, IBM asks that you remove non-IBM components from the PC before you bring it in for servicing. The reason for this is that IBM service people feel that non-IBM products could affect some of the diagnostic tests they perform on ailing PCs. However, repairing machines with non-IBM components in them is "generally no problem and we would try and work around the situation," according to IBM.

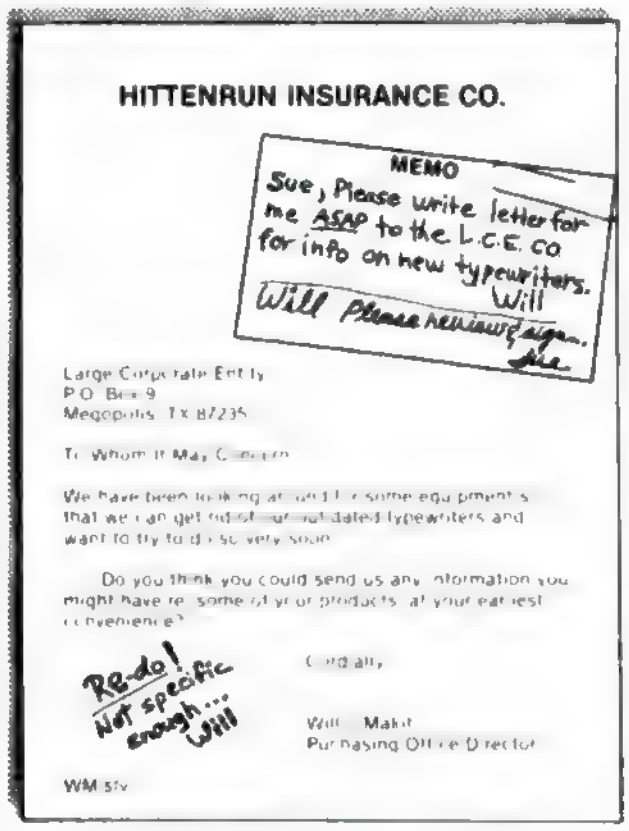
ComputerLand dealerships contacted emphasized that they would honor warrantees and repair non-IBM drives on the same terms that they would drives with the IBM label.

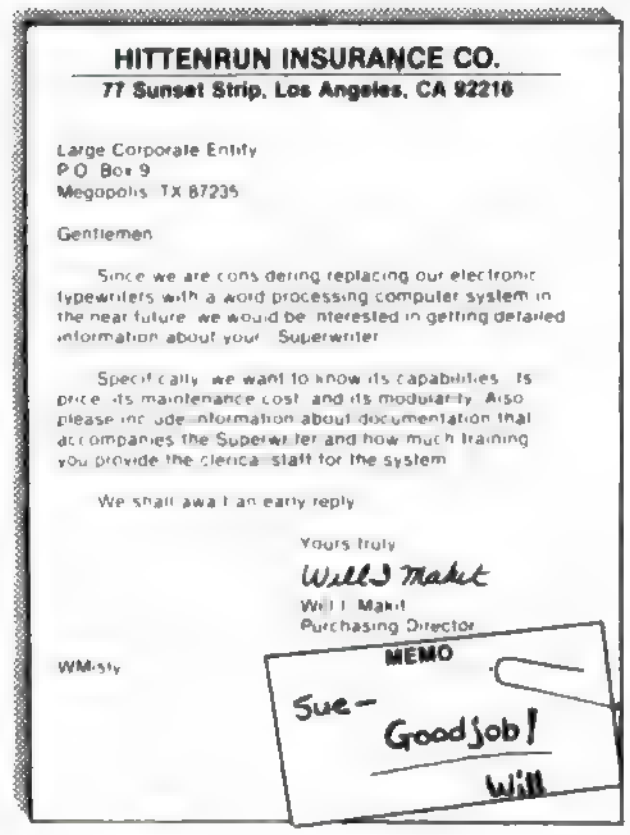
Another concern deals with reliability. It seems that not all double-sided, double-density drives are created—or at least tested—equally. Bob Roswell, co-owner of several Maryland ComputerLands, reported that he had found reliability differences between the IBM drives and Tandon drives. "I have probably sold three times as many IBM drives as Tandon drives. I have never had a drive motor fail if the

Is it possible, in fact, that even a seasoned competitor such as IBM is suffering from growing pains?

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drive had an IBM label. But I have had three or four Tandons fail in the last year and a half. That is not very large number considering our volume, but the difference is there."

Speculating on the Market

Several observers have been willing to speculate anonymously on the reasons for the shortages of particular components. Here, for IBM-watchers, are some explanations for the shortfall.

The Grass Is Greener Theory. In this scenario, IBM's second-party manufacturers are supplying products to IBM in the quantities called for by their contracts, but not in sufficient quantities to keep up with demand, which is running far ahead of projections. Since other computer manufacturers and dealers are willing to pay more for the bare drives than IBM, it makes dollars and sense to divert as many units as possible away from Big Blue. Thus, even though IBM sells drives that are manufactured by Tandon, Tandon may make more money on one of its drives sold by an independent for $380 or so than it does on its drive sold under the IBM label for $529.

The Big (Press Conference) Bang Theory. IBM may be preparing some major changes. One dedicated IBM-watcher discounted the possibility of supply problems. "My guess is that IBM has something up its sleeve. A few months ago *MultiPlan* disappeared for a while. When it became available again, it worked on the XT hard disk. The same thing happened with the color card, which was switched a few months ago—first the scarcity, then a revised product. Now monochrome boards and parallel port boards are in short supply. My guess is that we will soon see a new, very high resolution board with a parallel port for the IBM PC."

Seems reasonable enough, since third parties such as Hercules Graphics are making much hay on high resolution (720×348) monochrome boards for the PC. Why the rush? *VisiOn*, the VisiCorp-IBM answer to the Apple Lisa, will be a much more impressive product on a screen with higher resolution than is currently available.

Could a similar change be in store in the disk drive department? If so, there are at least three possible developments:

- A switch or option for 96 tracks per inch (tpi) 5.25-inch floppies may be planned. This would give double-sided drives about 800K of storage compared to

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the 320K for 1.1 DOS and 360K 2.0 DOS. A disk capacity of 800K would bring the IBM PC back within striking distance to Apple's Lisa.

● Thin-line drives are being readied. This would allow either four floppies or two floppies and a hard disk in a single unit—nearly doubling the disk drive sales potential for each PC sold.

● IBM is rushing its 3.9-inch micro floppy to market in hopes of establishing a beachhead against Sony's 3.5-inch micro floppy.

The Theory of Evolution Theory. Perhaps IBM is shopping around for or has already arranged for the manufacture of its drives either by other suppliers or in its own facilities. One would guess that with the great rush to desktop computers, the Selectric division of IBM may be looking to expand its potent manufacturing expertise into a new and lucrative area.

The Black Hole (of Calcutta) Theory. IBM has recently begun marketing the PC in Europe and Australasia. Perhaps the supply of various components is being diverted to foreign markets.

The Nontheory Theory. This theory holds that the shortfall is a combination of theories one through four above, with emphasis on the inability of the current market to keep pace with a rapidly increasing consumer and manufacturer demand.

CONTINUED shortages of current proportions will not affect demand for PCs.

On The Future of the (PC) Universe

The final and perhaps ultimate question is "What will be the effect of product shortages on IBM's relations with the ComputerLands of the world and with its consumers." Although continued shortages of current proportions will not affect demand for PCs, the shortfall threatens to expose the illusion of invulnerability surrounding IBM and its products. It does affect the corporate consumer who has no time or patience with working around service agreements that do not apply to non-IBM components, particularly when he or she had no choice but to accept non-IBM or nothing.

The shortfall offers some ray of hope to the PC clones and lookalikes, particularly the portables, if they can indeed reach market in sufficient numbers to meet the ever rising demand.

The situation buys precious time for companies like Victor (which is currently completing a new three-building manufacturing facility in California), which may indeed have built the better mousetrap, but remains unable to make enough of them to catch the mice. */PC*



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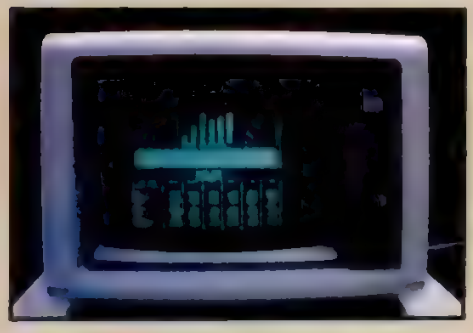
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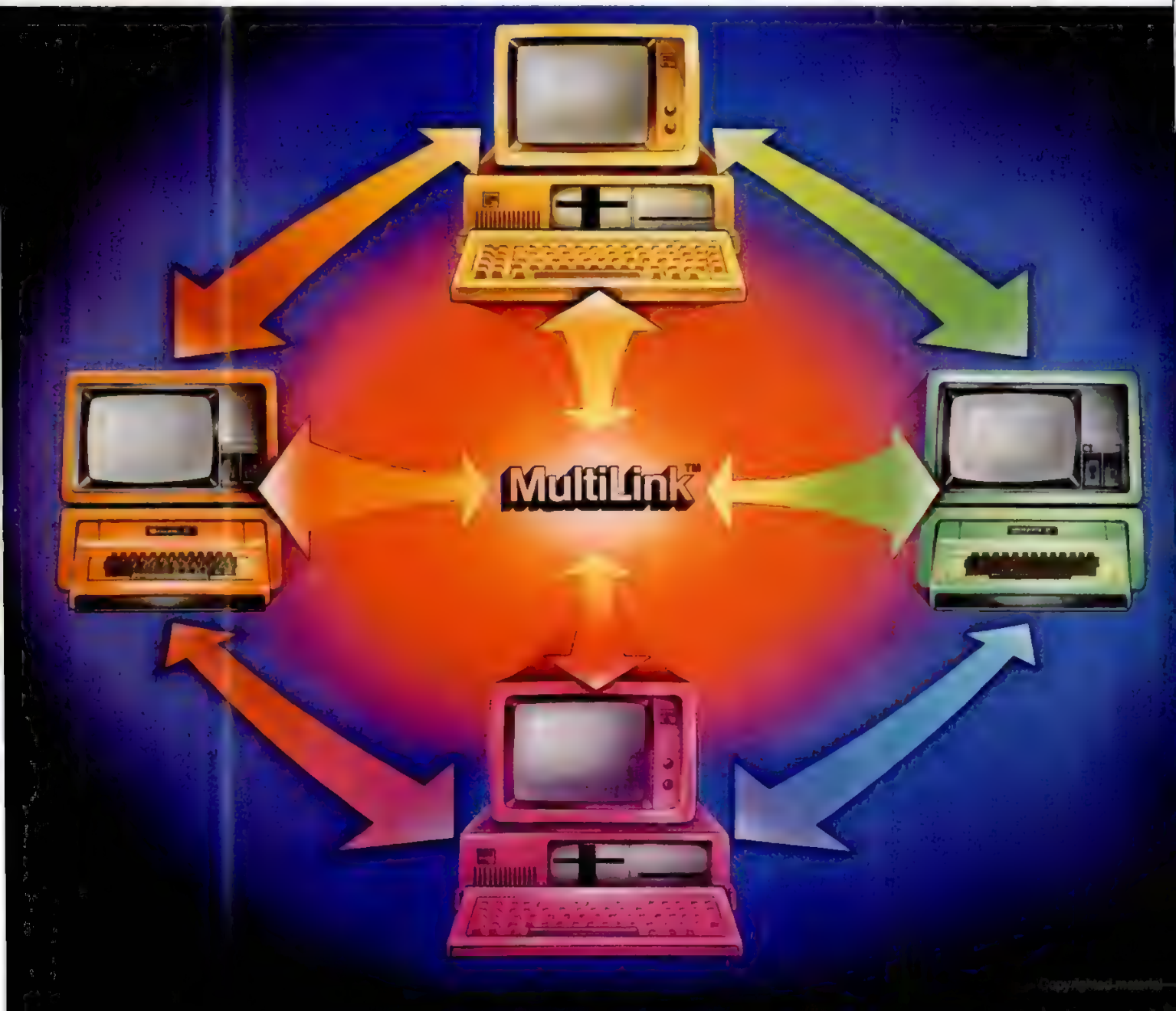
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How To Choose A Database Management System

At times, the "global village" we live in seems like a Middle Eastern bazaar. Everywhere we go, someone is hawking information. If it's not a useful photocopy of the minutes of last Tuesday's meeting, it's a special news-focus on bargain vacations in the Caribbean. As more and more information vies for our attention, we become threatened by input overload.

Some microcomputer manufacturers and distributors seem to feel that the most seductive quality of the desktop computer lies in its potential as a tool for helping manage this flood of information. They may be right. Even the language is expanding to reflect their point of view. Terms

that describe the growing number of microcomputer information storage and retrieval systems have begun to infiltrate our everyday vocabularies. One of these terms, *database*, is used to define the total information available in a particular context. Another, *database manager*, refers to software that manages that information.

Until recently, there were few powerful database management programs available for micros, and these were generally inflexible and otherwise difficult to use. You either had to program existing software to fit particular applications or, due to the small workspace allowed by the RAM available to most 8-bit machines, be content with a less than completely polished user-interface. Today, with more RAM commonly available for microcomputers, programmers can design comprehensive, user-specific software.

However, when you consider that the user interface can take more time to design than the functional portion of the program, it is no wonder the status quo changes slowly. We can look forward to more easy-to-use programs, database managers included. All of the programs reviewed here represent the most popular database-management software presently available. Except for *1-2-3*, however, these programs were first developed for machines other than the PC.

In the plethora of advertisements touting database managers, there may be terms you don't understand, performance specifications that confound you, and promises

THE HARDEST part of learning to manage information is analyzing the way you work.

of speed and efficiency that are either incomprehensible or hard to believe. To guide you in your choice, we present here five people in different occupations with specific application needs. We look at the software they chose and analyze the appropriateness of each program to the requirements of the user.

Personal Information Needs

The hardest part of learning to manage information is analyzing the way you work. It has been said that computers make us think more logically. This is perhaps as much a threat as a blessing, as you will learn when you begin working with a database manager. The result of converting to a computerized database management system may be a vastly improved way of dealing with information; however, the act of setting the system up and incorporating it into your work can be very challenging, to say the least.

You will use a tool, the computer, in conjunction with another tool, the software, to create a very personal factotum: your information manager. It will save time, give you more control over your information, and reveal important relationships between types of information. It is a tool of your own creation, and you must think carefully and precisely about how you want it to work with you.

Data-management systems are built from a tandem of information storage and information retrieval. The first thing to consider, then, is what information you want to store. Maybe you read dozens of periodicals and have trouble finding an article when you need to refer to it. Or suppose you own a small retail business and find it difficult to glean the necessary inventory information from your sales slips. You might be in a corporate environment, drowning from the recurring wave of photocopies in your "in" box. There's also information from meetings. And what about those slips of paper you've collected from phone conversations?

Perhaps you're on top of your paper mountain and merely need to revamp the way you organize the information you generate with your computer, or receive from the in-house mainframe or from a commercial information utility like The Source or Compuserve.

The way you put information into your manual filing system provides an important model (if not an exact replica) for your computerized database manager. But you have options. Would you necessarily do it the same way, or should you redesign your current system? You must evaluate your procedures. What about actual data entry? Do you enter data yourself or does someone on your staff handle it? Consider at what point in your work process you enter the data. Do you take care of it as it comes in (upon receiving and reading a report, for instance) or do you update your files at predetermined intervals?

All information has value, but not equal value. Its value may be determined by how current it is or by the way it relates to other information. Knowing a supplier is becoming difficult to work with, for instance, may or may not be of value, depending on the importance of that supplier to a particular stage of a project.

DATA-management systems are built from a tandem of information storage and information retrievel.

Define the different types of information you use, and determine if there are time factors or tie-ins to other information that might guide you in evaluating it.

Finally, estimate the amount of information you need to store. Depending on the nature of the job, estimates can be fairly exact or little more than wild guesses. You should sketch the limits of your database because they will be a deciding factor in your choice of software.

If you sit down and analyze how data comes in, and how it enters your record-keeping system, you've taken the essential first step toward finding a database manager that can work with you.

Next, you need to decide on the form and content of your data output. When do you need access to information? While talking on the phone or while preparing a memo for a meeting? Would a screen display be adequate or do you need a printout? Is a rough summary enough or do you need a well-designed presentation?

What is your information-selection process? Do you regularly look for one particular kind of information, people who are 60 days late in paying their bills, for example? Or do you have different needs at different times? Perhaps you need to review all memos you've written in the last 6 months about Senate Bill 226

at one moment, and half an hour later, it's time to check sales-performance figures for 1982.

Do you keep your information in two or more distinct groups? For example, do you keep complete client information files separate from complete vendor files, since each group of information contains many items that have no bearing on the other? And though it may be easy to analyze your customer preferences or your vendors' best deals, you may occasionally need to look through both files to find a relationship between the two, such as the most lucrative markets for products with the best margins. (Indeed, this ability to search and report information from more than one file at a time is a hallmark of relational databases.)

ABILITY to search and report information from more than one file at a time is a hallmark of relational databases.

Suppose you need your database output to interface with another program. There may be information in your database that you'd like to manipulate in a spreadsheet. Or perhaps information from your receivables database could be used directly in the preparation of an invoice or a letter. Also, with the increasing number of good business graphics packages on the market, you might consider the value of a black and white or color picture presented on a screen, paper, or slide.

Considering these questions may help you define as well as refine your data-control requirements. Where your designs are ambitious or complicated, you may make a false start or two. However, if you consider the rewards of an information system that works the way you work, the time spent clarifying your needs may be the best work-related investment you'll ever make.

Database Terminology

You probably don't think about databases when you look through the white pages of a telephone book or examine a baseball boxscore, but the fundamentals of database management can be easily understood by considering these two examples. The "white pages" directory of the phone book is a list arranged alphabetically by last name. It consists of names, addresses, and phone numbers of people living in one geographical region. If we were to consider the white pages a database of information, then each person would be a record, and his phone number, address, last name and first name would be the items of information that make up the *field* of the record.

Similarly, a baseball boxscore lists names and statistics. Next to the names of the players and their positions are performance tallies that include the number of times at bat and the number of hits, runs, and runs batted in. The boxscore is a database; each player and his associated statistics is a record. Each item of information about the player (name, position, times at bat, etc.) is a field.

What about information that doesn't fit neatly into rows and columns, records and fields, tables and lists? A student might stick colored dots on his research reference cards to cross-reference them. By using a color-coding system for those cards that apply to more than one subject, he avoids having to recopy any of them. Unlike a box score or the white pages, organized by records and fields, this student's cross-referencing system uses "key words" as its basis for organization. In the same way, database systems can utilize "key words" to retrieve information.

Claims of "incredibly fast sorts" in database advertisements are common. What is the significance of a "sorted" database? Consider the prospect of looking for a name in the telephone directory if it weren't organized alphabetically! In database terms, the phone book is indexed according to last name and sorted in alphabetical sequence.

In a book, the index gives page numbers to pinpoint the location of a particular piece of information. The index of a database works in the same way. It points to the physical location of the records. To create an alphabetical sorting, you make an index of all the last names. The computer database manager uses the pointers provided by the index to determine the location of each record of information (not just the last names, but the entire record). It then has the ability to consult this index in order to find the record in which a particular last name occurs. The program can also sort, that is, physically rearrange, the records in the database. If the sort was performed by last name in alphabetical order, you would create a white-pages-type listing. The last name, in either case, serves as the *key*.

The yellow pages, in database terminology, are sorted by two keys. The primary sort is by type of business, and the secondary sort (the sort within the sort, so to speak) is by company name. If you're looking for Jimmy's Lobster Company, you flip past businesses such as Bridal, Insulation, Ladders and Lawyers until you get to Lobsters. Then, to find the one and only Jimmy's within the Lobster section, you scan the lobster-company names from A to J.

Although sorting provides one way to find information, such as in our Lobster search, the ability to search (also called *select* or *query*) goes beyond physically rearranging the information in one particular order. Looking for information in the yellow pages, for instance, can be slow and inefficient, as you know if you've ever tried to find a restaurant near your hotel when you're in an unfamiliar city. A database manager, designed to work with you, can give you information based on any scheme you select. Although different from sorting, the process of searching or selecting information also makes use of the indexes prepared by the database manager. The more fields of information that are indexed, the more specific your search criteria can be, and the more elaborate the search possibilities.

THE BOXSCORE is a database; in database lingo, each player and his associated statistics is a record.

Once the search is successful and the

particular information that meets your criteria is located, you can choose to display it on the screen, print it as part of a report, or copy it to a disk file for future use.

As you become familiar with the terminology, these common-sense concepts of information management become integrated with the way you work. It may be that you are forced to think logically about something that you've always reacted to spontaneously before. Or you may have to look at your work process from a different perspective. However, as evidenced by the yellow pages, you already deal with database concepts constantly.

Scenario: A Writer Chooses a Manager

A writer, a lawyer, a real estate broker, an office supplies company and a software company sales manager have all recently chosen database managers. They all do different work and have different input/output requirements; consequently, they opt for different database managers.

A writer buys a computer for word processing. She needs help filing her notes, research, outlines, and drafts. Much of the available software is unsuitable because she does not want to delineate the exact layout of the database until after she begins to use it. She'll never be able to think of every possible item that she may want to include. Also, none of the structured databases allows her to add more than a line or two of text per field.

She makes some preliminary inquiries by talking to retailers, mail-order houses, and software companies. For input she wants to work spontaneously and type in notes from a variety of situations: telephone conversations, magazine articles, random ideas, the address of a good Chinese restaurant, and the synopsis of an article she is planning. She is willing to commit herself to key words as she goes. She'll assign all the words that reference the entry at the time she enters it. (See Figures 1 and 2 for examples of sample restaurant database file.)

There is no set formula for estimating size requirements in a system as free-form as the writer has in mind. However, choosing a paragraph as an average-length entry, she estimates the people file and bibliographic-reference file at 200 items each, her ideas file at 50 to 100 items, and her "yellow pages" file at 100 items.

She wants to be able to retrieve infor-

THE MORE fields of information that are indexed, the more specific your search criteria can be.

YOU MAY have to look at your work process from a different perspective.

Figure 1: Partial listing of DataFax restaurant database key words. First column shows frequency of occurrence of each key word in this database. The second item (Benihana) in the column occurs four times: "Benihana of Tokyo," three times, "Benihana Village," just once.

```
DataFax(2.4a) New Exam Scan Print Delete Keys AutoKeys File Load Unload Quit:
    5:  BEEF
    4:  BENIHANA
    3:  BENIHANA OF TOKYO
    1:  BENIHANA VILLAGE
    1:  BENSALEM
    1:  BERGHOFF
    1:  BERNARD'S
    2:  BISUTEKI
    2:  BISUTEKI JAPANESE STEAK HOUS
    1:  BLACK FOREST INN
    2:  BLACKHAWK
    1:  BLACKHAWK RESTAURANT
    1:  BLUE FOX
    1:  BOBBY MCGEES
    1:  BOHEMIA
    2:  BOOKBINDER'S
    1:  BOOKBINDER'S OLD ORIGINAL
    1:  BOOKBINDER'S SEAFOOD HOUSE
    1:  BOOTLEGGER
   20:  BOSTON
    1:  BRASS KEY
    1:  BUDAPEST
Press <SPACE> to continue; else <ESC>
91 keys listed.
```

Figure 2: A DataFax screen display of a submenu of restaurant database showing credit card codes.

```
CREDIT CARD CODES

THE FOLLOWING CODES REPRESENT THE CREDIT
CARDS INDICATED.  IF THE CODE IS IN A
RESTAURANT'S FOLDER, THEN THAT
RESTAURANT WILL ACCEPT THAT CARD.

AE - AMERICAN EXPRESS
CB - CARTE BLANCHE
DI - DINER'S CLUB
MC - MASTERCARD
VI - VISA
EX - EXXON


[1 OF 216 folders] Edit Delete Print Copy Next:
```

mation quickly, based on a key word. Printed output is only occasionally necessary, but linking some entries in a common disk file is essential, so that she can gather them into a word processing file.

After looking through a manual at a computer store, she decides that *DataFax* from Link Systems in California is the program for her. Within a couple of hours after setting up the disks and browsing through the clear and informative manual, she is manipulating the name and address example file on the disk with ease.

Within a week, the writer starts to incorporate the program into her daily work flow. After a telephone interview, for instance, she types her notes into a *DataFax* file. *DataFax* provides her with enough word processing capability to make the data-entry seem familiar. In fact, it allows her to reassign the *DataFax* keys to emulate the key functions of her word processor. When she finishes each entry, she includes the key words that she wants to use to retrieve this information.

When she needs to retrieve data, she hits a few keys and is presented with a screen asking for key words to begin a search. If she is unsure of her key word options, she can take a look at all the key words in her database, or she can give *DataFax* a rough guess and get a display of her dictionary's 21 closest key words. Seeing a display of her own key-word list, she realizes that she could have been more precise in setting it up since she sees many overlapping key words such as "wine" and "wines" or "New York" and "NY." Fortunately, she can either delete or add key words.

NONE OF the structured databases allows her to add more than a line or two of text per field.

Suppose she wants to find a note about an article on Robert Redford, the author. Assuming she was practical in assigning key words, she could bring up the particular note she wants by selecting the key words "author" and "Redford." If this fails, she can select first "author" and then "Redford" to view all pertinent entries relating to either key word. If she wanted to search for a note about Robert Redford, the actor, she could employ the same strategy, first looking for all entries relating to the combined key words "actor" and "Redford," and then searching from these key words separately.

She can display the information, send it to the printer, or save it on a disk. She can also view and then print each entry selectively. She can use the database as a calendar, by storing key dates rather than key words.

The writer's initial estimation that she would need very little printing capability was not quite accurate. She finds it very useful to engage the *DataFax* printing feature that allows her to output a specified number of lines. For instance, she's been consistent in typing name, address, and phone information, where applicable, on the first 6 lines of each entry. Using the delimited print feature of *DataFax*, she has a rough equivalent of the more structured name, address, and phone list, selected and printed out by project.

Even as she continues to think of more ways to use *DataFax*, she marvels at how quickly the program has become essential to her work process. She has succeeded in identifying an information storage and retrieval system that works with her.

Superfile to the Rescue

A Customs lawyer is inundated with photocopies. Most pertain to new laws on the importation of merchandise into the United States. Up to now, the lawyer has been content to let the papers accumulate for a week or two until his staff can organize and bind them chronologically by type of merchandise, country of origin, and date. If a client calls requesting information about current laws applying to the importation of polyester knit handbags from Haiti, for instance, he simply finds the binders with the applicable rulings and refers to the most recent ones applying to Haiti.

Unfortunately, this can take too long when a number of laws apply and he must search through several binders to find the ones relating to the country in question. And he can't very well make duplicates of all the printouts that apply to each individual country, since many rulings relate to more than just one country. He also has to flag temporary or pending rulings to distinguish these from permanent ones. These subtleties are beyond the capabilities of present manual filing systems, and frequently he has to dig through a mountain of paper, filed and unfiled, to find the pertinent information.

SHE MARVELS at how quickly the program has become essential to her work process.

Although many other branches of law have been using legal information utilities, this specialized branch is the laggard in the field. As a business that depends on information too esoteric to be part of a commercial information utility, this law firm needs to organize its information in-house. So far, however, it has converted only the staff functions of time billing and word processing to computers; the lawyers in the firm using personal computers are using them on their own. As the youngest partner, the lawyer in question feels that using his PC to manage government updates might speed up automation in the rest of the firm.

His input/output requirements for a database manager will not be much more complicated than they are now. He already prepares photocopies for filing by using a yellow marker to indicate subject, country, and date. He would like to add a paragraph that summarizes the ruling, and an indication of the binder location of the actual ruling.

The size requirements for his database are likely to be large. If he transfers the materials already filed in his manual system into the database manager, he would need to allow for as many as 3,000 entries, each a paragraph or two in length.

The main output will be to the screen, on a ruling-by-ruling basis, selected by criteria determined by client needs. To access this output, the lawyer wants to be able to search by key words such as country or type of law. He would like to send

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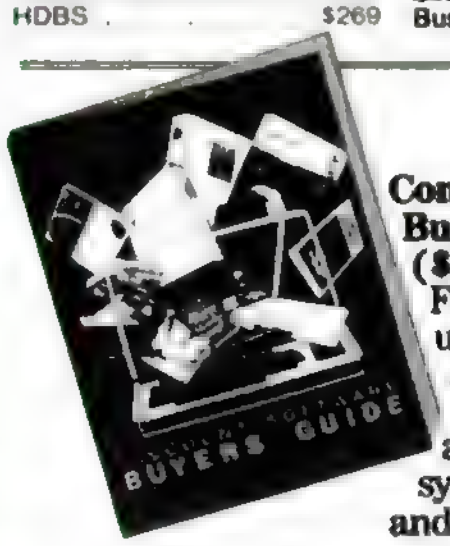
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CBasic Compiler (MSDOS) $495
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related entries to a disk file for future inclusion in a letter or report. On occasion, he needs to print out a list of related rulings. But he expects that the main usefulness of a data manager will be in providing a cross-referenced index to what is essentially a bibliographical database.

For example, if he gets a call about polyester handbags from Haiti, he puts together a search for entries that include polyester, handbags, and Haiti. He receives the pertinent information and an indication of where the full printout of the information is located. Perhaps the most important justification for converting to a computerized database system was speed. However, considering the lawyer's need for extra capacity, the database will have to span several disks.

Superfile by FYI, Inc. is the program he chose to do the job (see Figure 3). When he talked to FYI, he got a straightforward summary of the features, as well as the limitations, of *Superfile*. Though *Superfile* does not really update or change entries easily, his system, bibliographical in nature, does not demand it.

Now, when our lawyer marks the printouts he wants filed, he includes (in addition to subject, country, and date) other pertinent key words such as "update 84" for those laws likely to be changed, and

ALTHOUGH many other branches of law have been using legal information utilities, this more specialized branch is the laggard in the field.

physical filing specifications such as "binder 6." The *Superfile* manual is a model of clarity and usefulness, going so far as to devote a number of pages to helping organize a key word dictionary to avoid time-consuming redundancies.

The same person who files the rulings now adds a little typing to the process. Using any word processor with a standard, ASCII output (one that doesn't export special, software-specific codes) the typist adds a *Superfile* entry for each ruling. These entries differ from standard text files by virtue of three special markers and a line or two of key words. Using the key words and text summary specified by the lawyer, the staffer zips through the data-entry phase in no time. To convert these standard text files into *Superfiles* takes only a few keystrokes and about 10 seconds. The output can be displayed, printed and/or filed to disk either continuously or on an entry-by-entry basis (see Figure 4 for example of file printout).

Suppose the attorney gets a phone call about batteries from Taiwan. With a few keystrokes he can view summaries of the pertinent rulings scrolling across his screen. If the lawyer wants a printout of the search, he can choose the printer option on an entry-by-entry basis, decide

THE Superfile manual is a model of clarity and usefulness.

he wants to print them all, and opt for continuous printing. In the case of a frequently-recurring question, he can save the selected items to a disk file.

The system is working so well that the

Figure 3: A Superfile screen showing main menu display that follows selection of a database.

```
Data Base is:
PRODUCT NOTES: COMPANY NAME, PRODUCT, DESCRIPTION AND PRICE
last modified 5/2/83
".SF1" FILES TO BE ADDED AS PREPARED: MONTHLY COMBINING FOLLOWS


                              Main Menu Options

 0 - Exit From Program
 1 - Search Data Base
 2 - Display Dictionary
 3 - Add More Data
Select Option 0 - 3 >
```

Figure 4: An example of Superfile screen output with all related file information included. The same entry can be printed without Superfile information (lines 3–5).

```
Insert Data Text Disk prodname
Enter Raw Data Disk  Drive A,B,C >c

( MUSIC )

Disk = prodname  File = TEST    .D01
*C
John J. Johnson, III
23 Arlington Avenue, #2C
Bellington, MA  02139
*
617-223-2345
IBM User group meeting of 4/12/83
Very knowledgeable about Apple music hardware/software
Knows of user-group sound-effects software
Writing music generator in basic (harmony possible, sort of)
(Knows Ken Arthwintle)
*K
IBM/UG/BCS/apple/sound effects/basic/music/Ken
*E


hit SPACE bar to continue
```

attorney is thinking of making up a *Superfile* database on all his correspondence. Since *Superfile* essentially superimposes itself on existing text files, this is a snap. A letter can be prepared for filing as it is being typed (using nonprinting "comment" lines common to most word processors) or after the letter has been printed.

SOME would find it difficult to do without an interactive search and update feature.

Should he want to delete or change entries, the lawyer faces a somewhat complicated series of steps to prepare files for re-indexing by *Superfile*. Since the data that makes up this system will not be changed, however, this limitation does not affect its performance in this situation. Although some would find it difficult to do without an interactive search and update feature (such as is available with *DataFax*), it is not a pertinent function for our lawyer. *Superfile* fits into the particular work situation of this lawyer and his staff. And this is the foremost benefit any software can provide.

A Realtor Trades In Her Cards

A real estate broker with a business going stronger than ever since she started to work independently needs to keep track of her numerous properties and clients. The list of properties she handles exclusively is certainly large and her others are even more numerous. Her clients stayed with her after her move, and referrals, from owners and clients, keep coming.

The real estate agent's approach to managing data has not changed in 20 years: a master list of properties, sorted by size (in square feet), backed up with 5- by 8-inch index cards, each with 20 to 25 items of information about the property on one side, and a list of clients who have seen the property on the reverse side.

In addition to automating her present system, the agent would like to be able to send out announcements to as many prospects as possible about properties as they become available. These mailings are too time-consuming to do by hand, however. As she shops around she keeps hearing about *dBase II*. When she finally gets a chance to actually read through the manual, however, she realizes that she's not willing to invest the time or money to program it.

She finds out about *T.I.M.* in a back issue of a computer magazine in what wasn't a fabulously complimentary review. She knows the name from advertising she's seen, but the program is obviously not advertised to the extent that other popular programs are. She's surprised to see it listed in a software sales chart as one of the best-selling database managers for the PC. When she talks to a salesman at a retail store, she gets a good report about the support the store gets from the people at Innovative Software. On the phone to them, she gets informative and helpful answers to her questions. They are quick to point out that the program (written in BASIC) comes in a faster (compiled) version now, having been through several revisions since its initial release.

As long as she can find software that lets her input and access her records in two distinct parts (property information and client visits), she realizes she does not need a database that works on two or more files at one time. She wants a full-screen editor to allow flexibility in designing the screens, adding data, and viewing selected records. The number of fields available to her is more important than the speed or size capabilities, since she'll have at most 300 records, but with as many as 35 to 40 fields per record.

She decides on *T.I.M.* based on the specifications and the recommendations of the telephone salesperson. She likes the fact that the entire program seems to be easy to learn and use and that it is menu-driven. She especially likes the two-screen feature of *T.I.M.* that will allow her to design a form exactly like the one on her index cards with a front and a back. (See Figures 5 and 6 for example of a two-part form for data entry.) Although *T.I.M.* doesn't specifically handle form letters and mass mailings, it allows her to transfer records to a disk file for use with *WordStar's MailMerge*.

When the program arrives she remembers having vowed to the salesman that she would sit down and read the manual for a couple of hours before running the program. After half an hour with the manual the terminology overcomes her, and the examples and tutorials at the back of the manual seem much more appealing. She proceeds to perform the clearly-documented set up/back up procedure and gets down to playing with the samples included with the program. Some of the messages are a little hard to understand, and at one point the screen displays "hit carriage return to enter or h for help." When she hits h she gets a message that says, "No help available at this point." Also, she seems to be forced to switch disks frequently on her dual 160K-drive system.

But by this time she's entranced by her "hands-on" session. The manual presents clear explanations on all the concepts, functions, and features of the program. As she works through the tutorials and examples supplied on disk, she refers to the reference part of the manual. All the time she's put in over the last few months thinking about how best to manage her real estate data and the software now at her disposal begin to mesh as she runs through the program. She's impatient to go ahead and set up her own database.

She perseveres however, waiting until she feels comfortable enough with the concepts and performance of this program. She then leaves the computer and takes a blank piece of paper and redraws her master list and file-card form, making sure that she has included all her fields.

SHE remembers having vowed to the salesman that she would sit down and read the manual before running the program.

In a very short time she has used *T.I.M.*'s full-screen editor to create the two screens that will replace her index cards. Soon she starts entering data. In the days that follow, she finds the speed of *T.I.M.* to be perfectly acceptable for her 300

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records. In her opinion, the best feature is the one that allows her to search with up to 10 criteria on as many as 40 fields. She can, for instance, find all properties of more than 100,000 square feet that a particular client has looked at since November of last year in a particular neighborhood. She can save these search strings, too. As for form letters, *WordStar* and *MailMerge* actually turn out to be less friendly than *T.I.M.*

SHE CAN find all properties of more than 100,000 square feet that a particular client has looked at since November of last year in a particular neighborhood.

The agent has found a database manager that works with her to manage information in much the same way she's been doing it all along (but more efficiently).

dBase II on the Supply Line

An office supply business has decided to automate and now has a PC in place running *WordStar*. There are two partners, brothers Bob and Raymond, one the "outside man" and the other the "inside man." Bob is the personable outside salesman who knows his customers, and Raymond is the detail-minded business manager who knows the books and the inventory. They want to find a database manager that will support the way they work and not just improve their recordkeeping.

For instance, during the course of the week, Raymond might remind Bob that the company paid a lot for NEC Spinwriter ribbons last fall and still has many of them lying around; he asks Bob about discount possibilities. Bob thinks about it, calls a couple of likely customers and then checks back with Raymond about quantity and price. Raymond figures the breakeven, factors in the cost of inventory and comes up with an acceptable price. By the end of the week, the stock is out of the basement and the money is on the way.

When Bob and Raymond relate information about inventory to information about customers, they are doing what a relational database manager such as *dBase II* does. Their database manager needs to be able to work with at least two totally independent files—one file composed of inventory records and another of customer information. The database manager should search each file simultaneously and pull out records that match separate criteria for each. That is, on the one hand, it must search the inventory fields that include information about cost and quantity and locate items that would be profitable to unload at discount. The program must also be able to search the customer file at the same time to find buyers whose preferences match these discountable inventory items.

Bob and Raymond estimate their size requirements: an inventory file of 1200 records of 25 fields; a customer file of 600 records of 15 fields.

Raymond discusses *dBase II* with retailers, mail order houses, and even members of special-interest groups such

Figure 5: A Screen from a T.I.M. sample file.

```
FILE: B:SALES      EOF      KEY: SEQ     DIR: +     SCREEN: 1
RECORD: 15 ( 15 )           DEL:N       TYPE:A
1  PROJECT NAME _____________________     2  PROJ # ______

3  CONTRACTOR _________                   4  ORD. RECD _______

5  PROJ. PROFIT ___________               6  MARGIN% ____

7  TOTAL COMM. ___________


8  PROFIT1 RECD ___________
9  PROFIT2 RECD ___________
10 PROFIT3 RECD ___________               11 TOT. PROF. RECD ___________

12 PROFIT DUE ___________



Lft   Rt   Up   Dwn  5=Insert  6=C dlt  7=Last  8=Date  9=F dlt 10=Exit
```

Figure 6: Second part of sample file from T.I.M.

```
FILE: B:SALES      EOF      KEY: SEQ     DIR: +     SCREEN: 2
RECORD: 16 ( 16 )           DEL:N       TYPE:N 2
13 A % OF PROJ. ____                     16 A - BASE _________
14 B % OF PROJ. ____                     17 B - BASE _________
15 C % OF PROJ. ____                     18 C - BASE _________

                          19 COMM RATE _____

20 A - COMM _________
21 B - COMM _________
22 C - COMM _________

23 A-COMM PAID _________
24 B-COMM PAID _________
25 C-COMM PAID _________                 29 TOT COMM PAID ___________

26 A-COMM DUE _________
27 B-COMM DUE _________
28 C-COMM DUE _________                  30 TOT COMM DUE ___________



Lft   Rt   Up   Dwn  5=Insert  6=C dlt  7=Last  8=Date  9=F dlt 10=Exit
```

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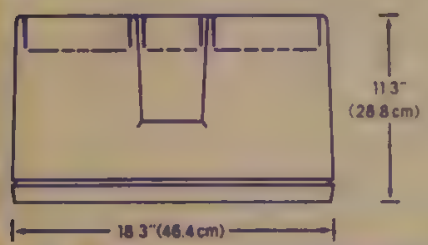
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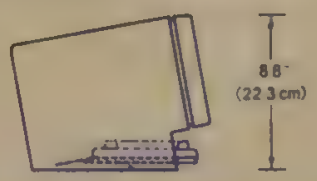
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By the end of the week, the stock is out of the basement and the money is on the way.

as the Boston Computer Society's Data Base User Group. The sort of relational job they require can be accomplished with *dBase II*, but only with programming. This programmability is the source of the power and flexibility of *dBase II*. Raymond is convinced that even though his introductory-level college COBOL is rusty, a variety of *dBase II* add-on products exists to cut programming time. Also, if all else fails, a growing number of pre-programmed *dBase II* application packages are available, as are programmers to create a fully customized solution.

Since Ashton-Tate, the *dBase II* publisher, offers a 30-day money-back trial period, it's hard to resist giving it a try. After receiving the program, Raymond becomes dissatisfied with the tutorial section of the manual and immediately orders the *dBase II User's Guide* from SoftwareBanc. This gets him going and provides well-documented examples. The book dovetails with the reference section of the *dBase II* manual and the working examples supplied on disk. Programming principles long forgotten are thankfully applicable here, and within 2 weeks Raymond is convinced that *dBase II* can handle his inventory and receivables. As evidenced by the examples included with the program, it is possible to write a menu-driven sales-tracking and customer database that is easy enough for Bob and the office staff to use. And this program will allow the sales information to interface completely with the invoicing and inventory functions.

After working with *dBase II* for a month, Raymond realizes that he needs something to take the tedium out of designing screens for the menus he is creating for each accounting and sales database module. (See Figures 7 and 8 for screen displays of a sample accounting module.) There is no lack of add-on software for *dBase II*; apparently many other users have found themselves in the same position. Standard Software in Randolph, Massachusetts and SoftwareBanc in Arlington, Massachusetts turn out to be good sources of *dBase II* products and support.

Though certainly not the only program-driven relational database manager on the market, *dBase II*, with its large number of users and corresponding degree of support, is a popular choice for many in a situation such as Bob and Raymond's. For someone not daunted by the amount of time required to program *dBase II*, or the money required to buy support software or hire a programmer, the power and flexibility of *dBase II* is an undeniably appealing combination.

Figure 7: In dBase II, *an entry into sample program via command line followed by main menu display.*

```
   DO XMENU
Enter check database name:CHECKS
Enter disk drive containing command files as 'A:' or 'B:':E



     CHECK BOOK BALANCER MENU

        0 - EXIT
        1 - ENTER NEW CHECKS
        2 - ENTER DEPOSIT
        3 - ENTER CANCELLED CHECKS
        4 - ENTER CANCELLED DEPOSITS
        5 - BALANCE

 ENTER DESIRED ACTION
WAITING 1
```

Figure 8: A screen display (dBase II) *following "enter new checks" option from "check book balancer menu."*

```
CHECK ENTRY     ENTER CHECK NUMBER OF ZERO TO EXIT
IF CHECK NUMBER=0, ENTER CARRIAGE RETURNS FOR OTHER ENTRIES
CHECK NUMBER          :       1027:
PAY TO THE ORDER OF :                                  :
AMOUNT OF CHECK       :       0.00:
DATE WRITTEN          :01/01/81:
PURPOSE OF CHECK

A - ADVERTISING             B - BANK CHARGES        C - CAR + TRUCK
D - DUES + PUBLICATIONS     F - FREIGHT             I - INSURANCE
L - LEGAL EXPENSES          S - OFFICE SUPPLIES     P - POSTAGE
R - RENT                    T - TELEPHONE           X - TAXES

ENTER PURPOSE LETTER: :
```

1-2-3 for a Sales Manager

A small software company is enjoying success even greater than predicted in venture-capital circles when their product was first conceived. No one knows this better than its enthusiastic if slightly worn-out sales manager. Though anticipating the inevitable return of the market to a less hysterical state, he must, in the meantime, keep up with the demand.

Raymond realizes that he needs something to take the tedium out of designing screens for the menus he is creating.

The sales manager does not want to do any programming. His micro experience is limited to being a reasonably proficient *VisiCalc* user. Though he's heard of the

fantastic capabilities of a programmable relational database manager, he doesn't need a program to handle more than one file at once. As long as he can do reports from his daily sales log, he's satisfied.

The manager's assistant will input the data from invoices generated by his sales staff. This daily input will total approximately 50 items of information about each record or transaction. Primarily, his output will consist of reports summarizing his daily transactions. These summaries will be based on multiple criteria selections—say dealers in New Mexico who sold more than 25 units in April. (See Figure 9 for sample directory display.)

> *How could a database manager be reduced to a grid of rows and columns?*

After reading several articles about Lotus Corporation's 1-2-3 he decides to check it out. He makes an appointment with someone who seems knowledgeable and arrives to find a machine loaded with an automatic demonstration of the program reserved for him. With its lightning-quick sorts and selections, this "limited database" he's heard about actually looks very impressive.

He's having trouble, however, even conceiving of a database manager that looks so much like what he's come to associate with a spreadsheet. After all, how could a database manager be reduced to a grid of rows and columns? He's accustomed to a database where everything except the items he's specifically requested is hidden in memory or on disk. (See Figure 10 for sample worksheet display.)

When the salesman comes by his work station, the concept finally sinks in. "Oh, sure, the database is fast and very flexible," the salesman cautiously concedes, "but that's because it's all taking place in RAM. You'll be limited if you don't have a lot of memory." This comment, pointing out the risk of using the program, has the effect of clarifying for the sales manager the concept behind this database. He realizes that it's as if you took the typical database, with its indexes, records, fields, and cross references all tucked neatly away in carefully-marked sections of the disk, and plastered it all over RAM.

Since his machine has 320K RAM, the sales manager has no doubt that it can handle up to 400 records. That he gets integrated spreadsheet and graphics capabilities and a limited memo-generating word processor are compelling reasons to go with it, too. Without even looking at the $500 database that the salesman wants to show him, he places an order for 1-2-3.

Within a few days he's using the spreadsheet part of the program intuitively. The context-sensitive Help screens allow him to hit a help button at any time and get a brief explanation of the syntax or logic of the program at that point. The *VisiCalc*-style menu of choices is more elaborate and yet easier to work with, and the file-handling capabilities allow him to execute all the most common DOS commands without even typing a filename.

Creating the database is similar to setting up any other database, but again, slightly odd, since the setup and data entry takes place in full view. Each row represents a record, and each column represents a field. Therefore, depending on the computer's memory capabilities, the manager can have up to 256 fields in a maximum of 2000 records. By adjusting the column widths, he determines the size of the fields of each record. He can include equations easily and in no time at all has a database designed and ready for input.

When his assistant gives him the daily

Figure 9: 1-2-3 screen showing File Manager Menu and Directory display. Menu describes 1-2-3's version of common DOS functions. Users can do all these things (except renaming) without typing file names.

```
Select primary sort key                                              SORT
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
Name  Extension  Date/Time  Size
Use date and time of last file update as key.
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
   FILENAME EXT     DATE       TIME     SIZE
   123      CNF  24-Dec-82   8:33am     128
   123      EXE  18-Jan-83   3:13pm   87296
   123      HLF  18-Jan 83   2:31pm  176858
   ASICLOCK COM  18-Sep-82              813         Current Drive:     A
   AUTOEXEC BAT  01-May-83   9:04pm      49         Number of Files:   15
   CHKDSK   COM  07-May 82  12:00pm    1720         Total Bytes Used:  322560
   COMMAND  COM  07-May-82  12:00pm    4959         Total Bytes Free:  0
   DISKCOMP COM  13-Feb-83   0:03am    1651
   DISKCOPY COM  13-Dec-82   0:06am    2019
   FILFMGR  COM  18-Jan 83   4:26am   15740
   FIXDOS   COM  09 Jan-83   3:55am    1193
   FORMAT   COM  07 May 82  12:00pm    3816
   INSTALL  BAT  01-Jan-80   0:24am     393
   LOTUS    COM  09-Jan 83  11:20am     406
   LTSLOAD  COM  09-Jan 83   1:35pm    8210
```

Figure 10: An example of a 1-2-3 worksheet with macros and user-programmed menus. These allow customization for efficiency and ease of use by others than the creator of the worksheet.

```
M10:                                                                        MENU
Worksheet  Range  Copy  Move  File  Print  Graph  Data  Quit
Global, Insert, Delete, Column Width, Erase, Titles, Window, Status
        M              N              O              P              Q
10
11              menu3                Location     Code          Revenue
12                                   Sort by CitySort by RegiSort by Revenue
13                                   /XG\S~       /XG\T~        /XG\U~
14
15              menu4                Yes          No
16                                   Return to 1-Don't do it'
17                                   /XQ~         /XG\X~
18
19              menu5                Bar          Grid Bar      Stacked Color Bar
20                                   Revenue vs. Revenue vs. Revenue vs. Profit (L
21                                   /GNUREV PROF/GNUREV PROF/GNUCOLOR STACKED~Q
22                                   /XMmenu5~    /XMmenu5~     /XMmenu5~
23                                   /XgLOC1~     /XgLOC1~      /XgLOC1~
24  Keyboard Macros
25  Alt S - Sort by Location   /DSRDdb~PA21~A~G(goto)A21~/xg\X~
26  Alt-T - Sort by Region     /DSRDdb~Pc21~A~se22~d~G(goto)A21~/xg\X~
27  Alt-U - Sort by Revenue    /DSRDdb~PE21~d~G(goto)A21~/xg\X~
28  Alt-W - Simple Analysis    (HOME)(goto)SUM~(goto)REGION~(?)~/RLR~(goto)C
29  Alt-E - Full Analysis      (HOME)(goto)c2~(?)~/c~CATEGORY~(goto)c3~(?)~/
                                                       CALC
```

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transaction input for the first week, he loads it onto the screen. If all he wants is a list sorted by state and by dealer, it takes a half-dozen keystrokes for the menu steps, plus pointing to the two fields with the cursor. He gets his two-level sorted list instantaneously. And if he wants a list of the activity this week in Texas, he simply tells 1-2-3 to print that specific portion of the sorted list. The margins, type size, headers, footers, and page numbers can be easily specified, too.

Suppose he wants a summary report on activity in a given region or at a given volume level. He would specify the fields to select on and then use the summary statistic command to get totals of the numeric field. To summarize sales in the Southwest to dealers who have sold more than 25 copies, he would define three variables: the input range, the criteria range and the output range.

The daily transactions data that were input by his assistant represent the input range. He steps through the menu, then points with the cursor to indicate the coordinates of this range. Then, for the criteria range, he goes to a blank area of the worksheet and types in the fields he wants to select (in this case, states in the Southwest) and his selection criteria. Then he goes to another blank area to design his summary report formats. He uses the tab and end keys to zip all over the 256-column by 2048-row spreadsheet.

To specify the input range, he simply tells 1-2-3 what the two corners of his database are. To specify selection criteria he types in the fields to be searched and the search definition. He then inputs the section location. In another blank part of the worksheet he creates the output range for the records that meet the selection criteria. In this area he types in as many or as few of the fields in his database as he wants to include in the report.

With one keystroke the selection process is accomplished and he is looking at the records that meet his criteria. At this point he can summarize still further and create another summary report based on the previous one. That is, he can turn this "output range" into another database. He can sort it by salesman or search it for particular salesmen.

A section of the manual describes a way to program 1-2-3 to assign a series of commands to a two-keystroke combination. In what is essentially a rudimentary—if somewhat complicated—programming language, 1-2-3 allows you to create your own menus. This makes it possible to present an almost transparent 1-2-3 to the person entering the data.

If the sales manager uses only the simple print formatting, he will produce printouts perfectly appropriate for his purposes. By engaging the easy-to-use graphics module, however, he can include charts and graphs in his reports. Also, by saving to a printer file, the database summary can be used with any word processor, including the rudimentary one supplied with 1-2-3.

It is possible that in the future the 2000-record limit could be a problem. But at the moment it's working the way he works.

A Smorgasbord of Data Managers

As more programs assume the existence of machines with greater RAM capacity, the interface between user and machine will improve. Also, as more machines are sold, increasingly varied information management needs will be met by programs more powerful, less expensive, or just plain unique.

A program called *Informa I* from Abacus Data in Jacksonville promises to be menu-driven as well as programmable. It will feature relational powers formerly associated only with the most expensive and solely-programmable relational database managers. Designed to handle the kind of large database made possible by hard disks, this program can still be learned easily and tailored to fit a wide range of needs.

A program called *FileMaster* from NF Systems in Atlanta costs $125, but has a range of capabilities equal to those of programs at four times the cost. A unique tree-structured information management system called *Questext* from Information Reduction Research in Concord, Massachusetts, goes a step beyond the filing approach by addressing the educational aspects of information storage and retrieval. Since one level of the tree can always be a "question" level and the next level an "answer level," a rudimentary form of the artificial intelligence community's "expert system" can be devised for everything from planning a wedding to teaching new staff members the ins and outs of your office procedures.

AS MORE programs assume the existence of machines with greater RAM capacity, the interface between user and machine will continue to improve.

A RUDIMENTARY form of the artificial intelligence community's "expert system" can be devised.

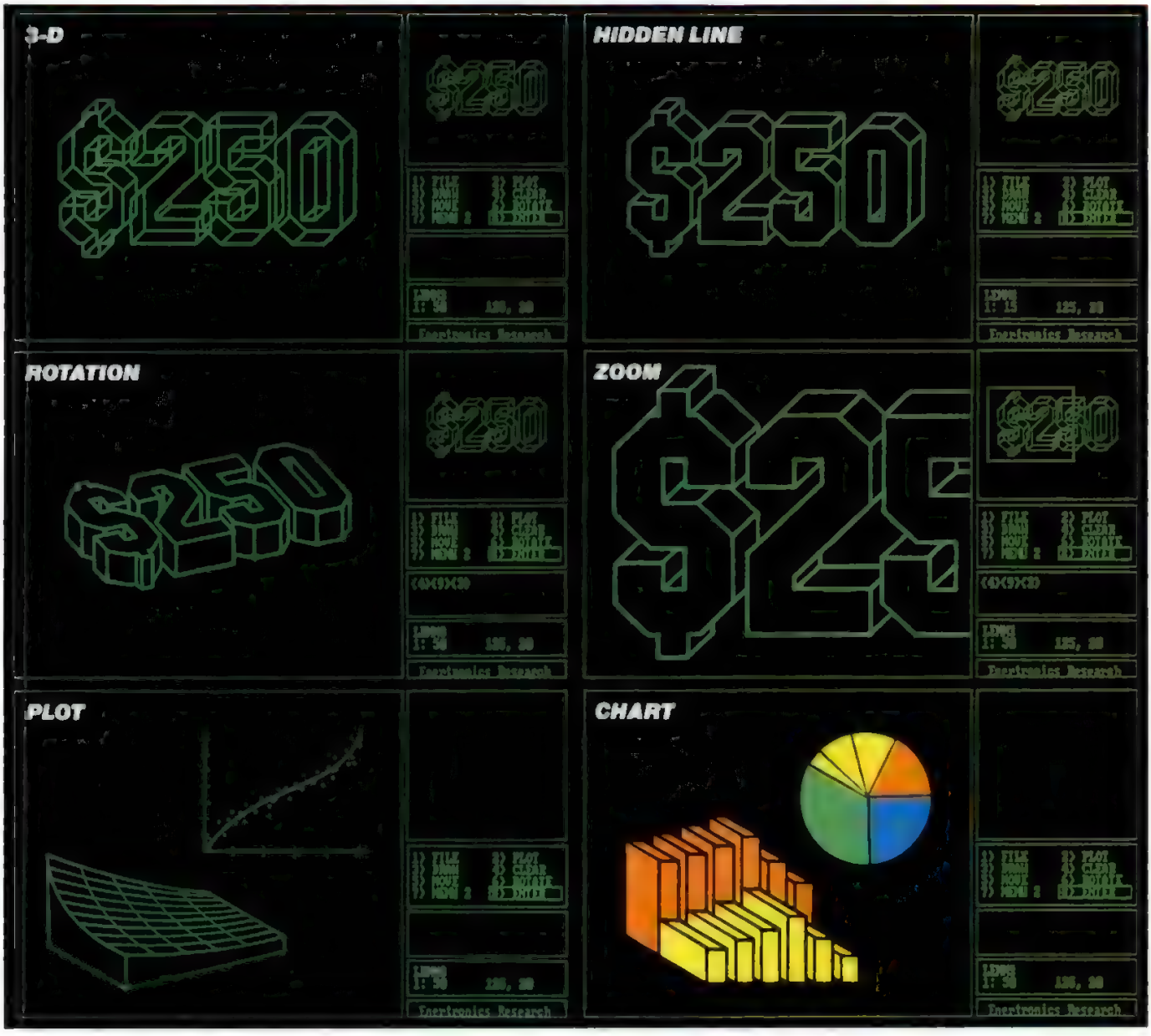
We have examined five work scenarios, analyzed their diverse information-handling needs, and reviewed five popular products chosen for the jobs. These particular programs are unique only in that they have managed to cope with the infamous bottleneck of distribution in the micro industry and have made their way to retail market. It should not be too difficult to find copies of them to look at in stores near you.

Then too, four out of the five producers will allow you to try before you buy. This can be the best way to get a look at a program and see whether it will meet your needs.

There are at least two dozen more packages available to consider and many more in development. Buying clubs and user groups, periodicals, and books such as Kruglinski's *Data Base Management Systems* (Osborne/McGraw-Hill) are other good sources of information.

It is possible to avoid feeling overwhelmed by the information in your life. If you can analyze your needs, you can find the right program to help you manage your information. /PC

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CIRCLE 228 ON READER SERVICE CARD

Comparison Chart Of Five Database Managers

This chart compares the features and capabilities of the five information storage and retrieval programs.

	DataFax	*FYI2000/Superfile*	*T.I.M. (Total Information Management)*	*dBase II*	*1-2-3*
	Link Systems 1640 19th St. Santa Monica, CA 90404 (213) 453-1851 **List Price:** $299 **Requires:** 64K, two disk drives or hard disk, monitor. Printer optional. **CIRCLE 618 ON READER SERVICE CARD**	FYI, Inc. 4202 Spicewood Springs Rd., #204 Austin, TX 78759 (512) 346-0133 **List Price:** $195 **Requires:** 64K, two disk drives or hard disk, monitor, text editor or word processing program. Printer optional. **CIRCLE 619 ON READER SERVICE CARD**	Innovative Software 9300 W. 110th St. #380 Overland Park, KS 66212 (913) 383-1089 **List Price:** $495 **Requires:** 64K (128K for records between 1000 and 2400 characters in length), two disk drives or hard disk, monitor. Printer optional. **CIRCLE 620 ON READER SERVICE CARD**	Ashton-Tate 9929 W. Jefferson Blvd Culver City, CA 90230 (213) 204-5570 **List Price:** $700 **Requires:** 96K, two disk drives or hard disk, monitor. Printer optional. **CIRCLE 621 ON READER SERVICE CARD**	Lotus Development Corp. 161 First St. Cambridge, MA 02142 (617) 492-7171 **List Price:** $495 **Requires:** 128K, two disk drives or hard disk, monitor. Printer optional. **CIRCLE 622 ON READER SERVICE CARD**
Ease of use					
Screen prompts	Good	Good	Good	Programmable	Excellent
Full screen	Yes	N/A—use word processor	Yes	Yes	Spreadsheet type
Menu driven	Yes	Yes	Yes	Programmable	Yes
Command driven	No	No	No	Yes, subset of language	No
Program driven	No	No	No	Yes, own language	Yes, in limited way
Keyword	Yes	Yes	No	No	No
Change structure	N/A—free form	N/A—free form	Easy	Easy	Very easy
Search	Easy, fast	Easy, very fast	Fast on indexed fields	Fast on indexed fields	Once learned, easy and fast
Search and update	Easy, fast	Complicated	Easy, fast	Easy, fast	Easy once learned
Forms/Reports	Limited	Limited	Extensive—can combine output of 2 files	Extensive, elaborate with more than 1 file	Fairly elaborate built-in formatter for reports
Speed and efficiency					
Frequency of disk access	Infrequent	Infrequent	Frequent	Frequent	None
Sorting less than 1,000	Very fast	Fast	Fairly fast	Average	Fastest
Sorting more than 1,000	Slow to average	Fast	Slow to average	Below average	Fastest (limited to 2,000)

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	DataFax	*FYI2000/Superfile*	*T.I.M. (Total Information Management)*	*dBase II*	*1-2-3*
Capabilities					
No. files on disk	1 (more with p-System)	Limited only by size	Limited only by size	Limited only by size	Limited only by size
Files extend to more than 1 disk?	No	Yes, up to 255 disks	No	No	No
Multi files at same time?	No	No	No	Yes	Yes, as worksheet and RAM permit
Records per file	As space permits—not much more than space of text entry	As space permits—not much more than space of text entry	32,767	65,535	2,048
Max. size of records	Limited only by disk	Limited only by disk	2,400 characters	1,000 characters	18,432 characters
Fields per record	Key words—approx. 100	Key words—250	40 fields	32	256
Max. size of fields	Key words—28 characters	Key words—64 characters	60 characters	254 characters	72 characters
No. of sort-indexed fields	1	1	16	7	■
Calculations:					
—fields	No	No	Yes	Yes	Yes
—formulas	No	No	Yes	Yes	Yes
—posting	No	No	No	Yes—to open file or disk file	Yes, to open files
ASCII Interface—output					
Word processor	Yes	Yes	Yes	Yes	Yes
Spreadsheet	No	No	Yes—also DIF	Yes	Yes
Graphics	No	No	Yes—also DIF	Yes	Yes—to internal graphics program
ASCII Interface—input					
Word processor	Yes	Yes	Yes, with T.I.M. utility	Yes	Yes
Spreadsheet	Yes	Yes	Yes	Yes	Yes
Ease of learning					
Help screens	No	No	Yes, some	No, but programmable	Yes, numerous
Sample databases	Yes	Yes	Yes	Yes	Yes
Tutorial	Excellent	Excellent	Adequate	Barely adequate	Good
Reference	Excellent	Excellent	Excellent	Good	Good
Telephone support	Good	Good	Good	Good	Excellent
Trial period	30-day trial period with fully-functioning program	30-day trial period with fully-functioning program	$50 manual and demo disk with 50-record limit	30-day trial period with 15-record demo	None

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IF YOU'RE CONFUSED ABOUT BUYING A PERSONAL COMPUTER, HERE'S SOME HELP.

Computers come in two parts.

One part is the "hardware," the machinery itself. The other is the "software," which tells a computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything. And vice versa. You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember it's the software that tells the computer what to do), it makes good sense to pick the software first.

Start by making a list of the things you want the computer to do. Possibilities include word processing, inventory control, accounting, graphics, recordkeeping—you name it, there's probably software that does it.

Next take your list into a computer store and ask the salesperson to demonstrate software that will do the things you want.

Even though you'll need a computer for the demonstration, keep in mind the computer is just a vehicle. The software is the driver. Once you've decided on software, picking the rest of the computer system will be that much easier.

The simpler the better.

Some people will tell you that software has to be complicated to be powerful. Nothing could be further from the truth.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you want to do without getting in the way.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

Simply see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask your friends who have them.

Or look at all the sales literature you can get your hands on.

But as helpful as that can be, there's no substitute for a live demonstration.

When you do go shopping, we recommend you take a look at the PFS® Family of Software.

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Currently there are four software packages in the family: PFS:WRITE, PFS:FILE, PFS:REPORT and PFS: GRAPH, with more on the way. Here's a little more about each of them.

PFS:WRITE. The simplest way to get your message across.

PFS:WRITE is ideal for people who want to make their writing time more productive. It displays what you write on your computer screen so you can make revisions as you compose.

With WRITE, you can correct misspellings or substitute one portion of text for another, with just a few keystrokes.

And when you're through revising, WRITE shows you "on-screen" just how your document will look when it's printed. So there are no surprises afterwards.

WRITE also works with most popular software programs, including the PFS Family of Software.

This feature allows you to add names and addresses from mailing lists to generate form letters. Or combine columns of numbers or graphs with your text.

PFS:FILE. The simplest way to get organized.

FILE is basically a paper filing system without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

With FILE, you arrange your information on a "form" you design yourself. And when you need to track something down, FILE sorts through your records electronically. It lets you retrieve information in a variety of ways so you can be as selective as you want.

PFS:REPORT. The simplest way to sum it all up.

REPORT is a powerful analysis tool that works with FILE.

REPORT sorts through your files and retrieves the information you're looking for. Then assembles it all into one report, so you can analyze, plan and make better-informed decisions.

REPORT is also good at math. It quickly sorts through columns of numbers and performs calculations, so you won't have to.



PFS:GRAPH. The simplest way to spot trends.

GRAPH is ideally suited for professionals who need charts or graphs in a hurry.

All you do is specify the kind of graph or chart you want and enter the information. GRAPH does the rest.

GRAPH transforms columns of facts and figures into pie, line and bar charts so you can spot trends quickly and make better-informed decisions.

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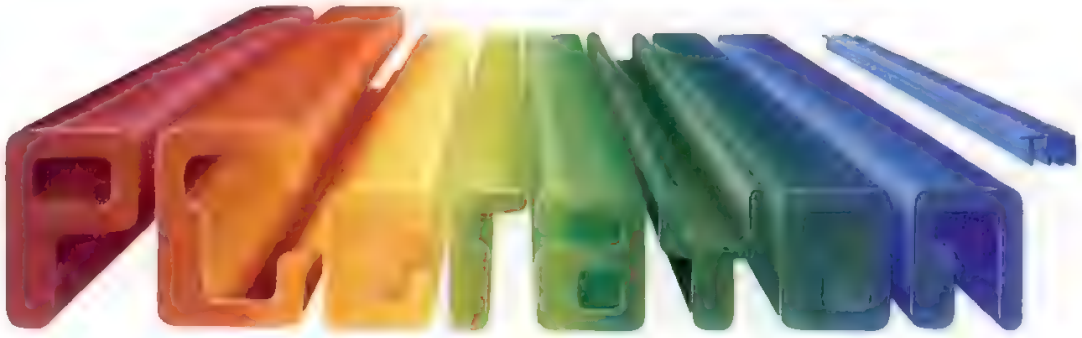
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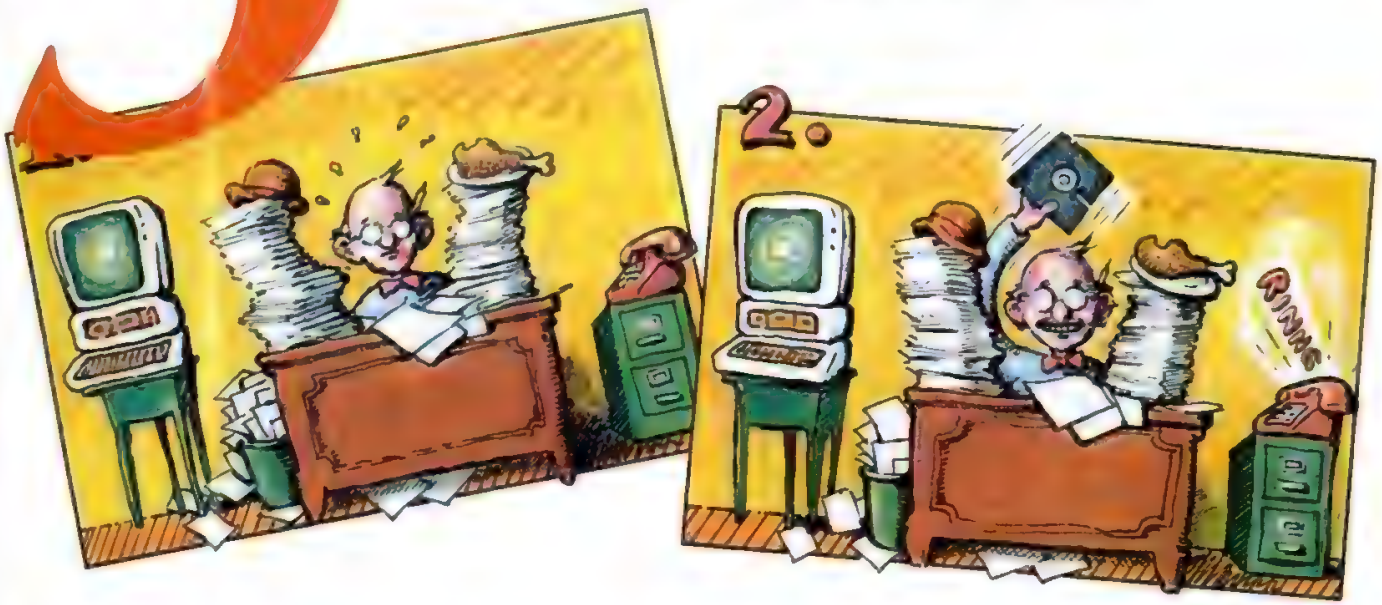
SYSTEM REQUIREMENTS: IBM PC, IBM DOS, IBM BASICA, 1 or 2 drives, color graphics board and display.

CIRCLE 345 ON READER SERVICE CARD

SOFTWARE/PAUL SOMERSON

Early desktop database managers were cumbersome and impractical tools. The best of those now available incorporate impressive gains in program design and execution.

5 DESKTOP MANAGERS



Ask a typical PC owner why he purchased his computer and he'll say he needed a word processor, or a spreadsheet, or a communications terminal, or a program development tool, or just something to tinker with in his spare time. Then after a second or two, he'll probably get a dreamy look in his eye and add "of course, one of these days I'm going to throw together a database that will totally organize my business and personal life . . ."

It's almost irresistible. Lurking within every PCer is the thought that this humming beige box can take a desk that resembles the bottom of a teenager's closet and, with a few simple keystrokes, transform it into a model of efficiency and order.

Executives neck-deep in manila folders long for the sound of softly beeping electronic files in totally paperless offices. Writers wax rhapsodic over hypothetical systems that could spew out, at the touch of a button, every note they've ever scribbled on leg waxing to Balinese monkey dancers. Salesmen's eyes grow wide as they concoct marketing strategies based on the ability to dive into thousands of digitized customer records and emerge with the names of every blond, left-handed female knicknack purchaser with a brown dog.

Software houses all across the country that have already flooded the market with seemingly identical word processing packages are now stamping out database management systems by the dozen. Their timing couldn't be better. When the PC was first introduced in 1981 you could order a system with a scant 16K RAM. Now the new motherboards for the XT *and* the PC are socketed for 64K RAM chips—which you can purchase today for $3 to $5—and XTs roll off the assembly line stuffed with a generous 128K.



Even though IBM still includes a cassette port on all its garden variety PCs (now really—how many users have ever stored a single byte of data on a cassette tape?), and offers inefficient single-sided floppy disk drives that can salt away a meager 160K, the PC and the XT can now shuffle 22 million bytes of data. The new IBM hard disk can read and write information ten times faster than IBM's standard floppy. Users are beginning to browse in earnest for database managers that will take full advantage of such storage.

Dominating The Market

Many experts agree that integrated packages, like Lotus's *1-2-3*, MicroSoft's *MultiPlan*, or VisiCorp's *VisiOn*, will dominate the business and professional market in the future. These programs allow users to move data back and forth between modules such as spreadsheets, word processors, databases, and even graphics systems, without excessive disk switching. They each provide standardized commands common to all of the modules, so that new instructions do not have to be learned for each procedure. And they make storing and moving information relatively painless.

Then there are the major league standalone databases, the best known of which are *Condor* and *dBase II*. These are very fast, very powerful, and very difficult for many users to learn. There are several interesting-sounding new packages, such as *Informa X*, which claims to be menu-driven and idiot-proof, and *Seed*, which is said to address and sort a potential 5 billion records. The market is becoming saturated with database managers of varying quality and ease of operation. To use all of the IUS *EasyFile* package, for instance, you have to juggle seven single-sided disks. If General Patton were alive today, he'd slap it.

The trouble is that none of these database managers is very well suited for everyday office use. The fully-integrated

software comes close, since you can insert a single disk in the morning and work with that one package's various modules all day long. But why should someone who is never going to have to use a spreadsheet have to pay for a program that includes one? And while these packages are internally consistent, they are not so flexible or easy to operate as they ought to be.

UtopiaWare

The ideal desktop manager would be lightning quick and a snap to learn and use. It would make extensive use of function keys, and would execute all instructions from whole-word menus with single keystrokes. Menus would always be accessible in varying degrees of complexity so that new users could get immediate, detailed onscreen help, while experienced users could dispense with them or see abbreviated versions as reminders. Menus would also be intelligent enough to know exactly where you were in the program so they could offer specific help, rather than just general information on how the whole package is assembled.

Such a database would contain its own top-drawer word processor, and interface smoothly with existing word processors, spreadsheets, and other popular utilities. The program would operate in the background so you could interrupt it and run other utilities if necessary, then return to the main program without having to reboot. It would allow users to create large numbers of separate file categories, each containing records of virtually any length. These files could sprawl over onto multiple disks, and could be rapidly indexed and sorted, with prompts to insert data disks at the appropriate times.

The program itself would be written in a relatively low level language like C, would perform all its functions speedily, and would reside on only one disk. It would work with all common printers, make efficient use of all the memory the PC can handle, and change its display to color when it recognized a color monitor. It would contain dozens of utilities for importing and exporting data, splitting and merging files, updating indexes and creating cross-indexes, sorting and searching records, and printing out information in a variety of formats.

For instance, if you wanted to index certain records with key words, the program would scan the entire file and list all of the words in your files in decreasing order of frequency. It would automatically delete such common shorter words as *a* and *the* and *to*, listing the rest on your screen, and highlight any proper noun, since personal and company names and addresses are all prime candidates for indexing. You could then move a cursor down this onscreen list and turn any or all of these into key words with single strokes. You would also be able to identify key words as you entered them, if desired. Ancillary cross-indexes could then be created without destroying the original.

WE'RE STILL in the software dark ages.

Such a program would also be able to search through files for strings of characters not identified as key words, and would be smart enough to compensate for spaces, punctuation, and capitalizations in the usual places. It would also know to check for misspelled variants of key words. It would allow data-entry templates to be created and revised without much fuss, and then stored conveniently. It would also recognize certain limits, jumping to the next field, for instance, after the last digit of a telephone number or zip code is entered.

Software producers should study what kinds of databases in which formats are widely used, and include templates in the package to speed data entry and retrieval. A name/address/phone directory that could print mailing labels and fill-in letters would probably head the list, followed closely by a daily calendar/scheduler, a customer contact record, and a free-form card file to index things like magazine articles. *VisiDex* tells users how to do just that.

Ideally, a businessman could boot up his desktop manager, see at a glance what appointments or reminders he had that day and in the days ahead, then call up a main menu with a single keystroke. He could then hit one key to open a file and begin entering text, identifying key words—again with one key—as he worked. At any time he could freeze and store what he was working on to recheck his calendar, look up a phone number, type out a letter, or switch to another file. A single keystroke would bring him back into his original file.

If he wanted to scan an index, the businessman could create a window in the screen and scroll quickly down it or jump from entry to entry. Or he could simply tell the program to search through all the files and call up every sentence with the words "tax credit" in it, one at a time, in an onscreen window. If he found a reference in his files that he wanted to incorporate into the text he was working on, he could hit one key and the data from his files would automatically be appended. When the businessman finished, he could file the new document away by itself, add it to an existing file, put it in a queue to be printed later, or print it on the spot. As a bonus, he could perform a word frequency analysis to identify overused words and to let him add the most often used words to his key word index.

Stacking Up

None of the programs reviewed here provides all the features mentioned above. *The Desk Organizer* comes the closest. It handles virtually every one of these jobs well, and throws in an automatic telephone dialer. But it won't handle massive data files or do string searches. (And none we've seen perform word frequency analyses.) Still, it's a gem. *Superfile* handles information from as many as 255 disks in one file, is very flexible, and works well with *WordStar*. *pfs:FILE* is astonishingly easy to set up and use, and gives the user such helpful options as the ability to tack on an extra note even if there is no room left on his template. The *Foresight Data Manager* makes good use of the PC's function keys, handles unusual formats well, and can search files for spelling variants. *VisiDex* has a good tutorial and comes in a nice box.

We're still in the software dark ages. Businessmen are not going to toss out their desks and file cabinets *en masse* and replace them with flickering consoles until computer operating systems and the programs themselves become far more

powerful and simple to use. Well-engineered packages such as *The Desk Organizer* are a step in the right direction. But computers—even the 3-year old PC with its aged 8088 CPU—are capable of much more. And with so many software developers going elbow-to-elbow for the business buck, the number and quality of desktop database managers should increase dramatically in the near future.

The mechanical bride is a long way off; The mechanical secretary, perhaps only a year or two.

The Desk Organizer
Conceptual Instruments Company
4730 Warrington Ave.
Philadelphia, PA 19143
(215) 726-7856
List Price: $250
Requires: 62K, 2 disk drives, 80 column display.

The first thing you notice about *The Desk Organizer* is that it won't do a thing until you take the plug-shaped "key" that comes with the package and insert it into the cassette port located at the back of the PC. You can copy the disk to your heart's content, but without this security device all the duplicates you make are just rust on plastic.

(A version that will work on the PC-XT—which has no cassette port—is expected shortly. This upgrade will revert to a more traditional copy protection scheme, and will take full advantage of the PC-XT hard disk.)

CONCEPTUAL Instruments spent more than 5 years polishing this program, and the effort shows.

Once you insert the plug, you watch it boot . . . and boot . . . and boot . . . and boot. The program is written in the 8086 assembler and UCSD Pascal, and has to load in a customized version of the p-System run-time module before it can even display the company logo. In fact, it takes about a minute and a half before the program is fully loaded and ready to go. If you need quick information and are accustomed to programs that are up and running in a tenth the time, this can be a nuisance. The package's designers say this is a function of the limited amount of space on IBM single-sided disks, and that with a double-sided floppy the program will load in under 3 seconds.

Highly Integrated

Don't get me wrong. *The Desk Organizer* is a dandy little package. If you don't have to shuttle back and forth between it and *WordStar* and *SuperCalc* all day long, you can boot it up when you buy your PC and leave it on until the day you trade your system in for a PC2.

The designers of *The Desk Organizer* threw in everything that normally sits atop a businessman's desk except the picture of his wife and kid. It is a combination mini-database/alarm clock/printing calculator/telephone dialer/memo pad/Rolodex/appointment calendar. And it deftly integrates all these elements so the automatic dialer can, for instance, get a telephone number from the Rolodex; or so the appointment calendar can automatically trigger the alarm clock.

Conceptual Instruments president Fred Collopy spent more than 5 years polishing this program to make it as easy to use as possible, and the effort shows. He started developing *The Desk Organizer* after an attorney who had hired him as a consultant asked if it were possible to "just type something into the computer, touch a button, and have it stored." Collopy studied the structured data handlers available at the time, and concluded that virtually all had been designed without considering the daily needs and routine of the typical businessman.

He scoffs at complex programs that force busy executives to learn arcane file handling commands, or that try to be all things to all people. "What people actually do at their desks is not what programs like *VisiOn* claim they do. It is crazy to assume that everyone needs a spreadsheet and a word processor. What most people need is something to schedule their time, and file away information, organize it, and make it easily retrievable. The majority of our users have assistants or associates who operate word processors and spreadsheets for them."

Training Big Wheels

Collopy stresses that programs like *VisiOn* are correct in establishing a common command structure for all operations. In fact, his very first sale was to VisiCorp. And he also agrees that the future of computing is in integrated programs: "The busy executive will have only four or five software packages. Software can't be purchased like record albums where you keep buying dozens of new disks; the bottleneck is the training required."

IT IS CRAZY to assume that everyone needs a spreadsheet and a word processor.

"It doesn't make much sense for a businessman to buy separate calculator and phone dialing and memo writing and data handling programs when one package could handle them all. Different programs force users to learn and remember different command structures, and switch disks back and forth all day long. And users may have trouble taking the information from one set of programs and using it in another." Collopy believes that by the end of 1984, the biggest category of business software will be highly integrated desk managers.

He adds that the true test of a good desk manager will be its flexibility and invisibility. "If it's done right, users will each see it from their own vantage points. Stockbrokers will think the package was developed expressly for stockbrokers; headhunters will think they're buying one made for personnel counselors; lawyers will assume they're buying a desk manager that was built around the needs of a legal practice."

Just Desserts

"The truth is that most desk tops are fairly similar and that most businessmen require the same basic kinds of organization and tools," Collopy claims. But as important as analyzing the needs of busi-

nessmen and devising software to accommodate those needs is coming up with the proper feel of a program. IBM is starting to implement this idea of invisibility or "virtuality" with DOS 2.0 by allowing users to treat hard disks and floppies almost interchangeably. The storage medium is incidental; all the user needs to know is that data is being stored somewhere and can be easily retrieved.

The same is true with all other program elements. Or, as Collopy puts it, "users don't care if the system works by integrated circuits or rice pudding. All that is important is that commands are consistent and easy to remember and that the entire package is simple to use and gets the job done more efficiently than without the computer."

But while a business program should not force users to master the complexities of operating systems, it should be flexible enough so that special needs and applications can be implemented if desired. Anyone—and he doesn't have to be a tweak freak—can change the way any of the commands in *The Desk Organizer* works, or personalize important toggles and variables in the program, using the built-in Alter function. However, Collopy has spent the last 2 years fine-tuning the operation of his program so that no major customization is really necessary.

During this period he has seen a pronounced shift in programming philosophy. "Years ago, software developers would beat their brains out trying to add higher and higher levels of complexity to their software in an effort to show what programs could do. Now the trend is to say 'what can we strip away to make it simple?' " He notes that this must be reflected in the documentation as well as in the program. "An overly thick manual hurts sales, and discourages users from learning some of the advanced features of a program. After a certain point, users—especially busy executives under time pressure—feel they've figured out enough and put the book on a shelf." This makes it imperative to streamline the command structure and the overall operation of the program as much as possible.

USERS DON'T care if the system works by integrated circuits or rice pudding.

Bare Essentials

Collopy claims that *The Desk Organizer* will eliminate virtually all of the usual clutter on the average executive's desk: "All you'll need is your computer and a telephone." It replaces an appointment calendar, a file card system, a calculator, a notepad, a clock, and a telephone dialer. But what makes the program so flexible and easy to use is that data does not have to be entered according to any preset formula. You aren't limited by predefined data fields. You just type in any information, hit a key to file it, then assign a label to it. At any point you can scroll through the many indexes you've set up to see what has been stored where.

The main screen is divided into seven windows. Time is displayed continuously in the upper right hand corner and the status of whatever you're currently working on in the upper left. The clock strikes the hour with springy, subdued notes that sound vaguely like muffled grandfather clock chimes. If you turn the alarm feature on, two musical notes will appear to the right of the time. When you first boot the program, a reminder is displayed in the status window that you can get help simply by hitting the Ctrl key. You may ask for assistance at any time, and the help screens are clear and to the point.

The Desk Organizer is so user-friendly that you are encouraged to turn it on and play with it almost before you open the manual. The advanced palette of Help commands makes this possible. When you ask for help on entering the program, the first screen starts with, "You are at the outer command level of the program . . ." and goes on to tell you how to explore additional program features, as if starting up an adventure game. As I stepped through the various screens, I almost expected to read, "A nasty dwarf appears from the shadows and throws an axe at you!"

Peel Me A Screen . . .

You can easily learn how to operate the system by sampling the help menus. Help operations, like all the others in the program, require only single keystrokes. And you can escape from commands at any time by hitting the Esc key. When you exit a help screen, the message is erased by a cinematic wipe—the words sort of peel away. If there was already something on your notepad, it peels back on as the help message peels off. Very classy.

THE DESK Organizer is so user-friendly that you are encouraged to turn it on and play with it almost before you open the manual.

Between the time and status windows is the "command area," which displays a menu made up of real English words, not the indecipherable abbreviations used by some programs. To select a command, all you have to do is enter the first letter of any word on the menu. There are two main menus, and you can easily switch back and forth between them simply by tapping the space bar. When you first boot the program, the "function" area below the status window contains a calendar showing the current month, and highlighting the current day. To its right is an index with one entry highlighted.

The large area below all these windows is the notepad, which holds up to a dozen 80-column lines, and fills most of the screen. The notepad is where existing files are displayed and new ones are entered. At the very bottom of the screen is a data gauge (spelled "guage" throughout) that measures how much storage space is left on your data disk.

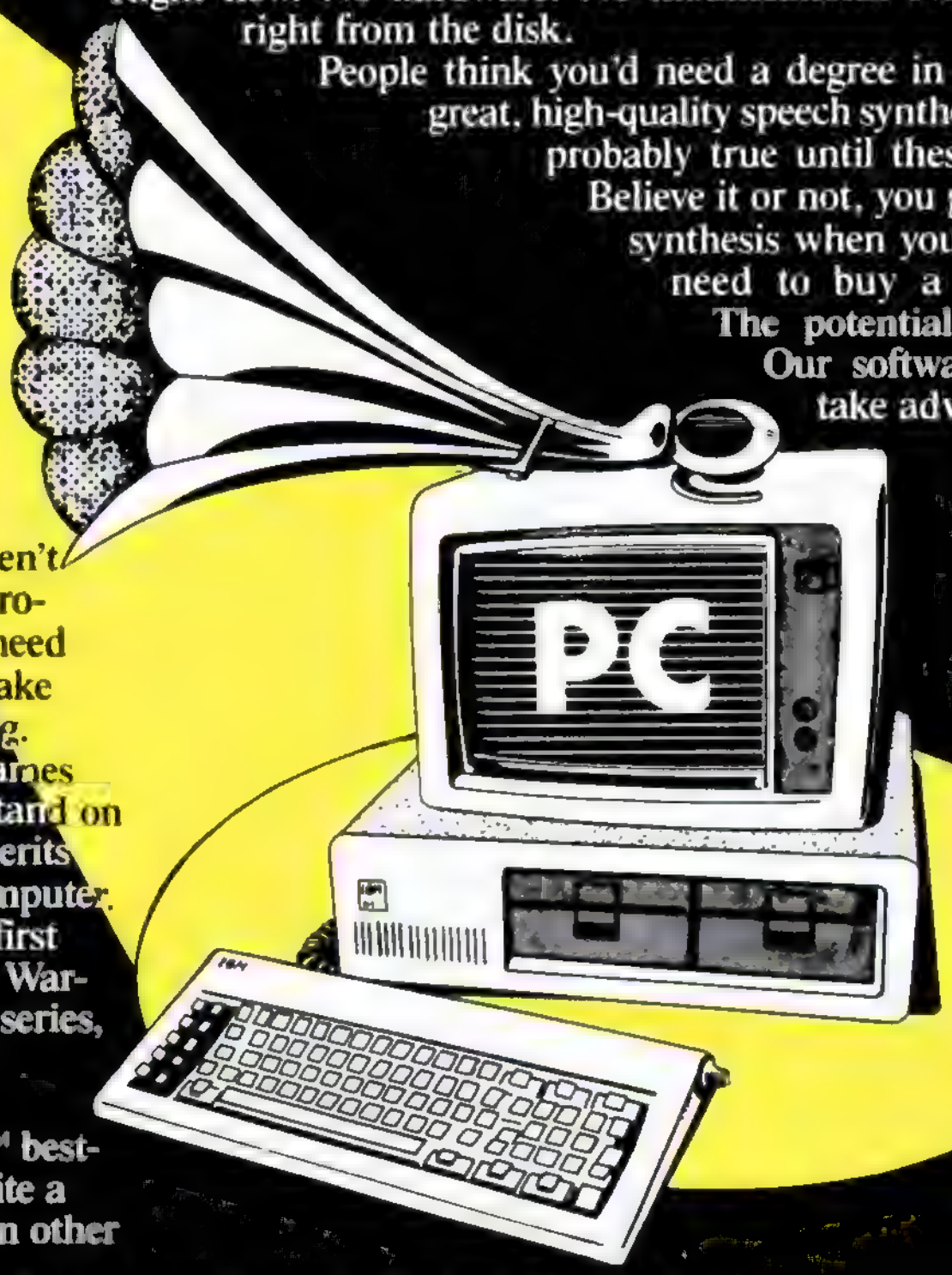
The index automatically alphabetizes the labels you assign to any of the notepad entries as they are filed, and displays seven of them at a time. You can scroll up or down through the index by using the cursor up and cursor down arrow keys. The Home key will take you to the first entry, and the End key to the last. The left and right cursor arrow keys display the names

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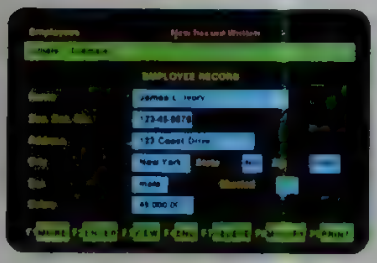
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It is Easy to Use:



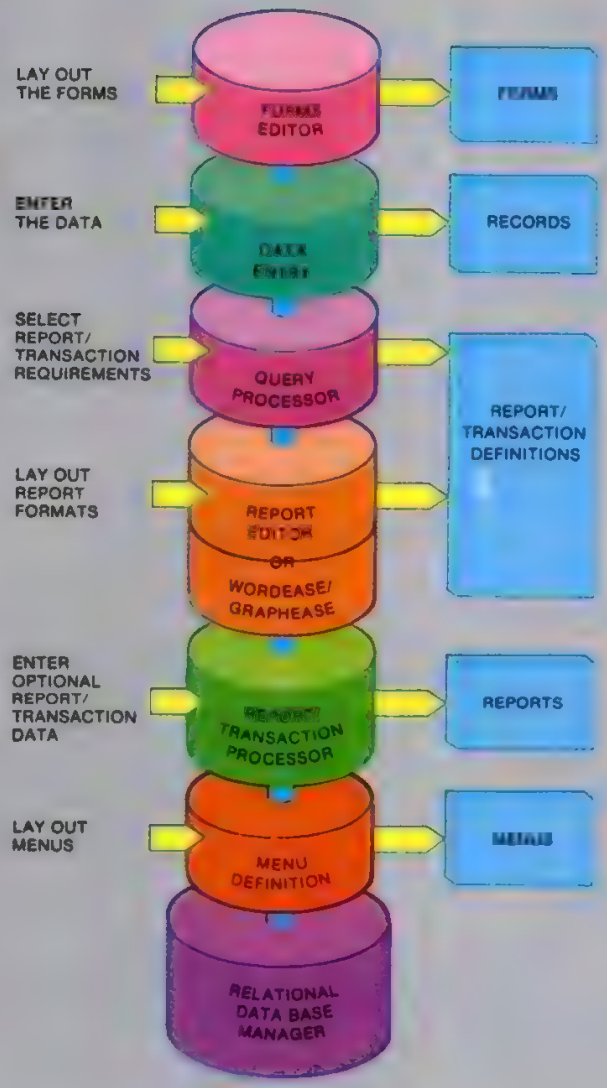
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of other indexes on your disk. To jump to these you just tap the Enter key. You can also jump directly to any entry in an index by typing in the particular label or part of a label you want and then hitting Enter. Again, very nicely done.

IT'S A REAL pleasure to use a program based on single keystroke commands.

From Ada to Ziller

The Desk Organizer comes with six sample indexes: *Calculations, Printers, WATS numbers, Journal, Reference,* and *History*. *Calculations* gives you 14 preset formulas to calculate such things as the future value of an investment or the monthly payment for a loan. *Printers* explains some of the advanced printing features of Centronics or IBM/Epson printers, and lets you toggle them permanently on or off. *WATS Numbers* gives you a short directory of toll-free airline and hotel phones. The *Journal* index comes without any entries, and is meant to provide a place to store records of past appointments and trigger the alarm for upcoming ones. *Reference* gives you a screen of instructions on every one of the package's 31 main features. *History* gives you several dozen thumbnail sketches on computers, from Ada and al Kashi to Thomas Watson and Irving Ziller.

Once you find something in the index you want to examine, you hit the R key, the first letter of the Recall command. It's a real pleasure to use a program based on single keystroke commands. The disk hums and clicks and the note flashes onto the notepad. For instance, scroll the History index toward the beginning, tap the cursor arrow once or twice to highlight "al Kashi," and in a second or two you see:

```
Jamshid ben Mas'ud ben Mahmud
Ghiath ed-Din al Kashi, a fif-
teenth century Persian mathema-
tician and astronomer, invented
a set of devices for computing
planetary conjunctions.
```

Hit J and jump to another label, type in "Zi" and hit Enter, and the index moves to and highlights "Ziller, Irving." Touch R and the screen fills with:

```
In 1953, IBM set up a project
under John Backus to develop an
automatic code to simplify pro-
gramming. This resulted in the
Speedcoding System. Backus then
joined with Irving Ziller to de-
velop another system. The Formu-
la Translating System (FORTRAN)
was released in 1957.
```

This particular index also contains the cross-reference labels "Backus," "FORTRAN," and "[1957]." To add cross-references in your index you simply hit the X key and then type in the additional entry. By hitting the I key, the calendar will disappear and be replaced by a list of all the indexes on your disk, with the one in use underlined.

Time Is Money

You can create up to 20 separate indexes, each with a flexible number of entries. The width of each entry determines the number of listings the index can store. With labels 20 characters wide, an index will hold only 110 entries. If you can live with 7-character labels, you can store 255; if you need thousands of listings all in one or two categories, this is the wrong program for you. Most businessmen can put all of their appointments, memos, and Rolodex listings handily into 20 indexes, each with 100-200 listings. If you know you'll need more than 200 phone listings, simply create two: one for personal numbers, and one for business.

Most of the notes and memos written by businessmen are time-related. Jobs have to be finished by certain dates, follow-up calls have to be made, orders have to be entered, conversations and letters have to be logged in, bills have to be paid and collected, appointments have to be scheduled. The built-in calendar tracks dates with ease from the first through the ninety-ninth centuries. The program lets you page through your calendar a day, week, or month at a time—or jump directly to a particular date. Best of all, any screen of information with an entry in the appointment index automatically triggers the calendar-reminder feature. Special appointments can trigger chimes or graphic displays.

Adding It Up

The Desk Organizer also includes two sophisticated calculators with eight registers and up to nine decimal places. The calculator can read formulas from the notepad, evaluate them, and assign the results to the registers. The program makes it easy to change the number of decimal places or switch back and forth between fixed and floating point modes. And, as expected, there are several nice touches. The program knows the values of *pi* and *e*. It lets you calculate certain trigonometric functions either in radians or degrees. And it toggles a little # sign at the bottom of your screen off and on to tell you which state your NumLock key is in.

The Desk Organizer can also recognize telephone numbers in your files and dial them automatically using a Hayes autodialing modem. This feature is extremely easy to use: You simply scroll down your index until you find the name you want to dial, and then hit P. It will only dial the first number listed in any file; this limitation will be corrected in future editions.

The function keys are preset so that you can add the current date and time to any file simply by hitting F9 and F10. Other function keys print the index label of the file you're working on, or the value of whichever of the calculator's registers happens to be active. You can attach up to an entire screen of information to any of the PC function keys.

THE BUILT-IN calendar tracks dates with ease from the first through the ninety-ninth centuries.

While it produces p-Systems files, the package contains simple utilities for importing and exporting standard DOS files. However, this process is slow. To bring in files, the program reads 12 lines at a time, fills the onscreen notepad, stores the screen, reads in another 12 lines, etc. These transfer utilities also allow data to

be moved from file to file within the program.

Smart Where It Counts

Conceptual Instruments President Fred Collopy claims that "*The Desk Organizer* is always smarter than you expect," and this is not just advertising puffery. The help function is excellent and will be even better, he claims, on double-sided disks. It senses where you are in the program and what kind of help you need, and then provides full instructions on how to proceed. You really don't even need the manual.

THE DESK Organizer sets a new standard of ease in the way it allows you to customize most of its processes.

There are other intelligent features. If you make an error when using the calculator, the program will point to the part of your formula or calculation that is giving it the problem. You can format disks or adjust printer controls from inside the program. Certain "soft" errors are corrected automatically.

One of the package's most impressive features is its ability to customize most of its operations. By hitting the Alt key and then the first letter of almost any command, you can see what steps are part of each procedure, and then change them to suit your needs. Throughout the entire program, any serious changes and deletions trigger a two-step verification check—and only then alter the defaults.

But it's *The Desk Organizer*'s ease of use that should make this a winner. To quote from Collopy's advertising:

> *Sitting at your desk you hear a pleasant tone. Glancing at your video display, you notice a reminder to contact an important client. You pick up the telephone and touch a button on your keyboard. The call is placed. While the number is ringing, you touch another key, recalling notes from a previous conversation. During the call, you page through an appointment calendar, schedule a meeting, review and revise an agenda, then generate a memo about it all for circulation to a selected list of associates. When you've finished the call, you touch a key to update your phone log.*

The Quality Shows

The Desktop Organizer works exactly as advertised. The only problem with the above process is that you're limited to a 12-line memo. The next version, expected this summer, will allow you to fill an entire 60 lines, or the equivalent of an 8½ × 11-inch page. It will also give you a full screen editor with advanced reformatting, let you store more than one index in memory at a time, boot 30 times faster than the current edition, provide a far more comprehensive help index, allow the calculator to use complex variable names and threaded logic rather than registers, handle color monitors, and run in the background so you can operate other programs at the same time.

After wrestling with dozens of cantankerous, slipshod programs, I breezed through this one. It is clearly a program that was *engineered* rather than just churned out. Single keystrokes tap you effortlessly from task to task. Seven windows simultaneously display all the features you need without clutter or confusion; it's like looking at a well-designed aircraft cockpit. The program bristles with intelligent help screens that know what you're trying to do at every stage of operation, and provide detailed assistance at the flick of a key. *The Desk Organizer* sets a new standard of ease in the way it allows you to customize most of its processes and define the PC function keys. Instead of crashing to a halt, it corrects certain errors automatically, and highlights others you've made. You can learn how to use it quickly without even opening the manual. My review copy worked flawlessly. Conceptual Instruments throws in a 12-month warranty, and provides a year's worth of free updates.

There's really nothing quite like this package anywhere else. Much of the software on the market today seems to have been slapped together with little regard for the user: Menus are often clumsy or nonexistent, instructions bewildering, manuals indecipherable and even incorrect, and overall operation a pain in the fingertips. But *The Desk Organizer* is a class act. Its current version is almost fun to use; the updated edition expected later this summer should be a genuine pleasure.

---

pfs:FILE
Software Publishing Corporation
Distributed by IBM
Boca Raton, FL 33432
(800) 447-4700
List Price: $140
Requires: 64K, one disk, 80-column monitor.

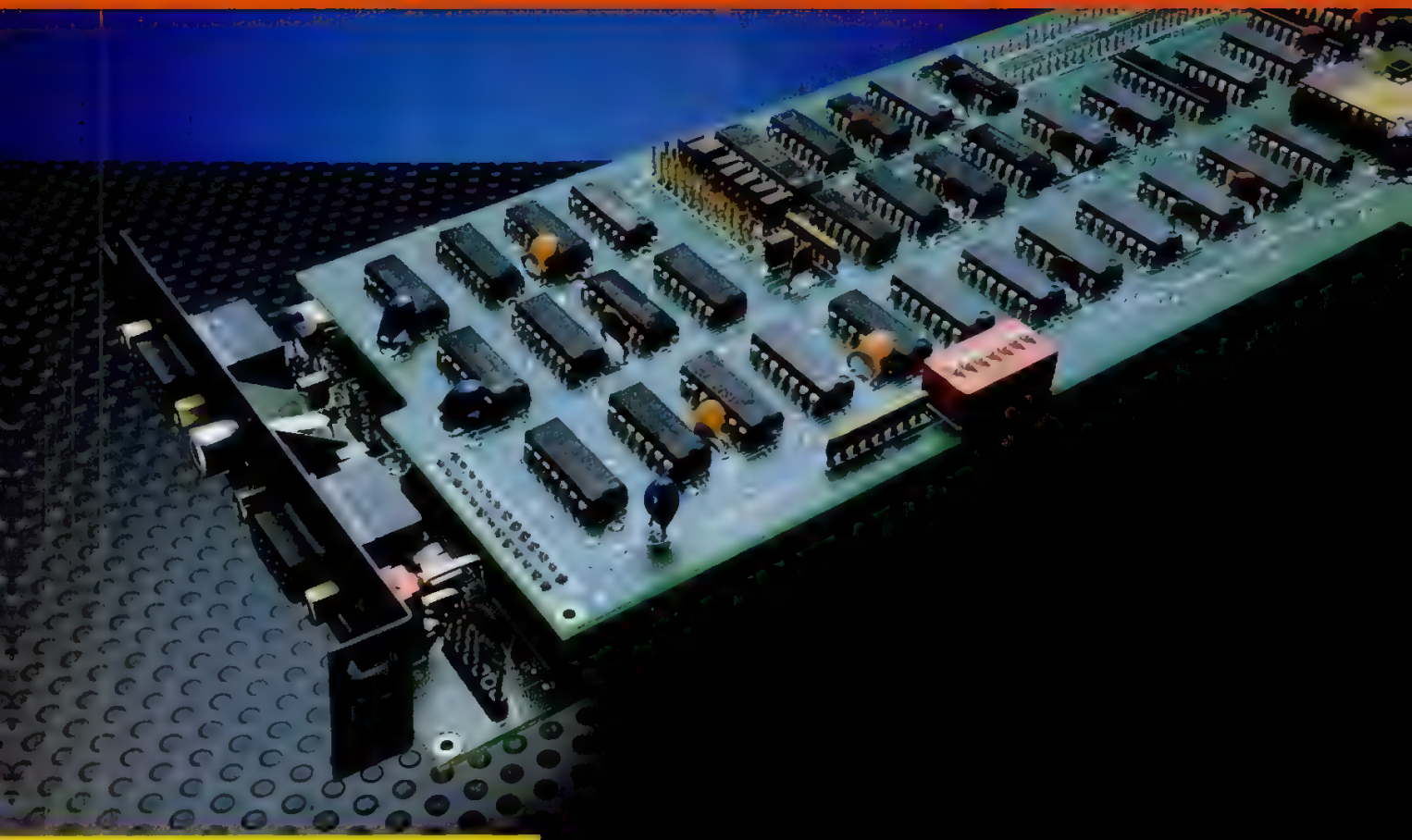
The microcomputer revolution has sparked a grammatical revolution as well. Software manufacturers somehow think that good products will be better if their names have odd punctuations, alternate spellings, jarring ellipses, or bizarre capitalizations. Half the programs on the market seem to have an uppercase letter imbedded somewhere in the middle; many of the rest are either all capitals or fully lowercase.

It is disconcerting, therefore, to open the manual provided by pfs: and see that even the manufacturers can't keep these unnatural spellings straight. On three successive covers the package is called *pfs:file*, but once inside it's referred to as *pfs:FILE*. Then, on top of that, the first message to greet you is "Use this publication only for the purpose of operating your IBM Personal Computer *pfs:FILE* application." What else did they have in mind? OK, these aren't earthshaking problems,

IBM SHARES the copyright, and it shows.

but they don't exactly inspire confidence.

Once you start poking around inside it's a different story. IBM shares the copyright, and it shows. The text is concise and well-written, pages are artfully laid out in



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Split screen demo is for ad purposes only

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the familiar black and green, and the package comes in IBM's standard D-ring binder. Best of all, the program works like a charm, although it could be far better with certain slight improvements.

Extra Strokes

The manual begins with an excellent introduction that shows how to install and back up the program. (Unfortunately, you can make only one copy of it.) It mentions that *pfs:FILE* "operates on the principle that information is kept, as the word implies, in forms," and gives you a bit of form theory. And it does a thorough job of explaining the vagaries of IBM file names and the functions of the IBM keys. Each chapter begins with a table of contents and ends with a brief summary; all manuals should be this clear.

The program is menu-driven. At almost any point you can hit the Esc key and return to the main menu. It allows you to perform seven operations: designing a template for the file, entering data, copying the file, searching or updating, printing, deleting records, or exiting. For some reason you have to hit the Enter key after typing in the number of the operation you want. The program's designers should have structured it so that a single keystroke would make the necessary selection.

Once you've selected an operation, the program asks which file you want to work with. It then stores the file name so you can perform additional operations without having to specify the name of the file again. Here again, the programmers should have included a step asking which disk your files are on. To put files on your B disk you have to specify B:FILENAME.

pfs:FILE MAKES extensive use of the tab and function keys, so much so that I suspect the program's designer was left-handed.

Left-Handed Compliment

pfs:FILE makes extensive use of the tab and function keys, so much so that I suspect the program's designer was left-handed. The tab jumps you from one heading to the next, cycling back to the first one when you get to the bottom of the screen. Virtually every other operation is performed by hitting the F10 function key. When entering information, the F5 and F6 function keys stamp the file with the date and time automatically—a nice touch—and F2 prints out the screen after you're done. All these functions are listed on the bottom line of the screen.

When you print out files, you are given the option of including or deleting your headings; although when you omit the headings, it doesn't reformat your information. On the printout, the data is indented as if the heading were invisible, but still taking up space on the page. This yields a ragged, rather unattractive hardcopy record.

The defaults are displayed onscreen and are easily adjustable. If you want, you can tell the program to print DOS files to a disk. This is handy as the program is written in Pascal and doesn't ordinarily produce DOS files that can be handled by other PC utilities. You can also print multiple copies at the flick of a key. It will also let you sort the files as it prints, and skip over any fields you want to omit from your printed copies.

You can copy the template, the entire file including the template, or selected files, to another disk. Copying selected files lets you split your file if it's getting too cumbersome, or create smaller subfiles. For instance, if your main file contained customers from all over the country, it's a snap to spin off a file of California clients only, or California clients who spend more than $500,000 and who are not wholesalers.

If you set up your files properly, the first word or number in each file becomes a keyword. The program can really sprint through such a "first item exact match" to retrieve a particular file, scanning across a thousand records in 3-5 seconds. Sequential string searches take far longer. If you instruct *pfs:FILE* to look for a particular combination of characters, it can take 2 or 3 minutes to examine an entire disk. However, allowing such string searches frees you from having to construct elaborate keyword indexes. And if your files are only a few hundred records long, any search will be fairly rapid. The program queues up any matches it finds, so you can bounce from one to the next with ease.

One More Thing . . .

Each "form" can hold up to 32 screens of information, and you can cram 2200 screens on a disk. One of the nicer features is that while you can create a template with specific headings (name, address, salary, date of employment, comments, etc.) *pfs:FILE* allows you to add an "attachment" page as an afterthought if you run out of space under a heading or need a new heading for one particular file.

YOU CAN'T USE the tab or Esc keys as you normally would on the PC.

As you enter information, the program automatically wordwraps, so you don't end up with bizarre fragments at the edges of your screen. However, it will not wrap from one screen to another; you have to hit the PgDn and PgUp keys to move from screen to screen. One small problem is that you can't use the tab or Esc keys as you normally would on the PC, as these control program functions.

pfs:File does a good job of searching for matches. If you are looking for a certain character string, it will ignore spaces before the first character of the string and after the last character. It treats multiple spaces within the string as a single space, and allows you to mix upper and lower case letters. Insert two dots before a string to be searched and the program will ignore any characters appearing before it in your files. Put the pair of dots after your string and it will ignore trailing characters. Put dots fore and aft and *pfs:FILE* will find every such string on your disk.

A Likeable Sort

Numerical searches are equally well-designed. The program recognizes com-

mas, dollar signs, dates, and times, and can easily sort all files entered two mornings ago that contain transactions greater than $10,000, for instance.

AN APPENDIX does give you precise instructions on handling such DOS functions, something few programs do well.

You may add information as you search. If you want to update all the records you entered in January, you can pull out the first one, make corrections or additions, and then move to the next one, fix it, hit a key and move to the third one and so on. The program will automatically save the revised information.

Adding a slash turns the search mechanism around. By hunting for /B.. you'll get every item that does not begin with the second letter of the alphabet. /.. will call up all vacant files. One quirk is that if you delete the first three files on your disk, then enter new information, the first file will begin with number 4. File number 4 will take up the space previously occupied on the disk by file number 1. Once you erase file number 1, you will not be able to call any subsequent file number 1. This sounds confusing, and it is.

pfs:FILE allows you to delete files a little too easily. While it does provide a warning message asking you to confirm your deletions, it erases files *in toto*. If you want to eliminate all of your California files from 1982 that were not repeat customers, it will happily do so without much fuss. But there may be files that fell into this precise category that you wanted to save, and unless you remember to save them ahead of time you might end up watching in horror as the program flashes all such screens before your eyes and wipes them clean. One more reason to back up your data disks.

DOS Boot

You can easily create a printed index by sorting and printing out one item, like a name. But you can't do this onscreen. Another peculiarity of the system is that it relies on DOS for much of its lower level file handling. *pfs:FILE* does not give you a utility to erase a template, for instance. It lets you erase all the information in each file, but if you want to remove the actual blank form, you have to exit the program, erase the file with a DOS command, then restart *pfs:FILE*. In addition, there is no disk directory. It would have been easy for the programmers to insert two more choices on the main menu: one that displayed your files, and one that deleted files no longer needed. An appendix does give you precise instructions on handling such DOS functions, something few programs do well. You'd expect this from any IBM product, and you get it here.

You are allowed a great deal of latitude in setting up your templates, and are advised to think about what future needs you might have before you commit them to magnetic memory. Creating a new template and funneling old information into it can be a tedious and complex task.

The manual includes sections on dealing with nonstandard printers and on calculating how many forms you'll be able to shoehorn onto your disk. It would have been a nice touch for *pfs:* to have put this formula in the package so that the program did all the mathematics for you. One nice feature is that the appendix not only lists and explains the few error messages generated by the program, but offers corrective actions. Why doesn't everyone do this?

All in all, *pfs:FILE* is a model program. It is absolutely a snap to learn and use, and it would be hard to find a better manual. It is flexible where it counts, does virtually everything advertised, and moves along at a decent pace for a database that relies primarily on sequential searches (although the manufacturers admit it could be faster). However, for certain applications, it requires the services of a companion program, *pfs:REPORT*.

It was probably smart to split the program responsibilities like this, so that users who didn't need the additional power of *pfs:REPORT* wouldn't have to fork over the additional $125. But since the two complement each other so neatly and do so little on their own, users might feel they should get one entire package for less than the total cost of both. It is important to stress, however, that *pfs:FILE* works just fine as a stand-alone package.

Visidex
VisiCorp
2895 Zanker Rd.
San Jose, CA 95134
(408) 946-9000
List Price: $250
Requires: 64K, one disk drive, 80-column monitor.

VisiDex exhibits all the makings of a winner—the classic VisiCorp packaging job, the slick, gorgeously typeset manual, the top-drawer graphics and layout—until you boot up the disk. Not that it's a bad program. With sufficient wheezing and struggling and head-scratching, you can get *VisiDex* to do everything advertised. But if you need a smooth, efficient desk manager, you may want to keep looking.

The manual is excellent, though slightly unwieldy. It is well thought out and laid out, but filled with much more information than you probably need. Should it really take 180 pages to learn how to use a fairly humble screen filing system and calendar? Granted, the manual provides an extensive tutorial, glossary, index, and reference section, but the beast is unnecessarily formidable. In fact, the package is bound in vinyl stamped to resemble elephant hide, and the metaphor is apt. *VisiDex* is somewhat powerful, at the expense of being ponderous and slow. There is a setup module on the disk called "runner," the name of which is the only part of the package that's quick.

SHOULD IT really take 180 pages to learn how to use a fairly humble screen filing system and calendar?

Standing Tall

Another manual quirk is that it sits

about three-quarters of an inch taller than the standard IBM issue, giving your bookshelf a somewhat ragged look. Still, it is quite readable, and lumbers along accurately and understandably.

If only the program itself were as clear.

UNNECESSARY double keying is precisely what programmable function keys were designed to avoid.

The first thing you notice is the famous VisiCorp cryptic horizontal menu. VisiCorp obviously wanted to retain the system used in *VisiCalc* and its entire stable of products. Its edit screen greets you with a cheery / UP DN LF RT BS HOME TAB INS DEL CTRL (HOME FBVEXRKY LF RT). Sure, once you know the program you'll understand most of these commands. And by hitting Ctrl+Y you get a slight amplification of some of the more obscure ones. But user-friendly it's not. And this from a company that has gotten much ink over its forthcoming *VisiOn* package that's purported to be so chummy you'd lend it money if it asked.

The program could not possibly have been designed with the PC in mind. A handsome drawing of the keyboard shows and labels the IBM function keys, but that's the last you'll hear of them. Which is peculiar, since many of the program's operations require holding down the Ctrl key before striking a letter. This kind of unnecessary double keying is precisely what PC programmable function keys were designed to avoid. If VisiCorp felt it important to use the Ctrl key so that users of its other products would not have to learn new fingerings, it should have at least duplicated some of the more important commands using the function keys. Even *WordStar* does this.

In the Raw

In addition, you first have to prepare data disks with the PC Format command, then load *VisiDex* and "initialize" these formatted disks with a separate *VisiDex* command. Why can't the *VisiDex* program simply start with raw disks? To its credit, the manual does show you exactly how to handle both formattings. Some programs simply assume you know your way around DOS.

Another indication that VisiCorp wanted this package to be all things to all systems is its selection of wildcard characters. If you want to search for a particular key word, you can use an asterisk (*) and minus sign (−). However, if you're accustomed to the MS-DOS wildcard system, you're bound to become confused. In DOS, an asterisk stands for a variable number of wildcard characters, and a question mark for just one. In *VisiDex* however, the asterisk substitutes for one and a minus sign for a variable number. While these problems are not earthshaking, it is a nuisance to have to remember peculiarities of various programs like this when it would have been so easy to standardize such things.

And these are not isolated examples of sloppy engineering. A good part of your time is spent shuttling between various menus and listening to your disks spin. In fact, certain commands fire up your drives and keep them whirring merrily away for seemingly interminable periods. If the sound of a read/write head scraping across iron oxide is music to your ears, then this is the program for you.

To its credit, *VisiDex* is loaded with safeguards to prevent you from losing your data. When you revise a screen, for instance, it gives you the option of saving the new one or the old one or both. Still, you can wipe out all your work by changing disks at the wrong time, and although this is mentioned in the manual, there is really no protection against it in the program itself. This concern for your records is admirable, but goes overboard. When you want to delete lines, you have to kill the line and then stop and wipe out a buffer. In fact, there were so many reminders and warnings, I felt I was handling something radioactive.

Glued to the Keys

Operation of the program is relatively straightforward, but cumbersome. It allows you to create data-entering templates fairly expeditiously. But when you start entering data, you end up glued to the Ctrl key again. There are 83 keys on the IBM keyboard; you'd think they could have reserved one for jumping from heading to heading when entering data. The way VisiCorp has it set up, you have to simultaneously hit the Ctrl key at one edge of the keyboard and the right cursor key at the other edge—a span of 17 keys that makes touch typing a thing of the past.

Creating key words is fast and relatively painless. You may set up multiple and multi-word indexes to any screen. Text can be highlighted in inverse or flashing video if desired for emphasis. For some inexplicable reason, tab positions cannot be changed. Editing is not difficult; neither is destroying data at the edge of your screen. "Push" text past the twentieth line or the seventy-ninth character of any line and it's gone forever.

VisiDex bills itself as a "personal information and calendar manager." It assumes your need for personal information will never extend past one screenful of characters at a time. This limitation is not so constraining when *VisiDex* is used as a calendar. You can throw appointments onto a screen and file them all away with a note reminding you to check them from one to fifteen days ahead of time.

Storing and retrieving these "keydate" screens is accompanied by the usual *VisiDex* cacophony of disk clattering and switching. After months of use, my Tandon drives sound like garbage cans banging down a steep hill, and the program's incessant disk chatter is jarring to the extreme. As with most databases, the speed of the program would be much improved and the disk racket eliminated by using an electronic RAM disk. However, you'd have to be scrupulously careful about transferring your data to a floppy before turning the computer off, or you'd lose it.

EDITING IS NOT difficult; neither is destroying data at the edge of your screen.

Call Me In 1999

VisiDex can display a calendar of any month from January 1970 through December 1999, and even suggests that you prepare separate disks for future years. By the time 1999 rolls around, or even 1985, the floppy you prepared today may be a museum curiosity. Still, it is a handy feature to be able to see—or print out—calendars within these three decades, along with any appointments you've electronically penciled in. Even better, as soon as you boot the program, it automatically flashes appointments and reminders for that day.

At the conclusion of the tutorial, the manual steps through three practical applications, showing you how to set up a customer service log, an index of magazine articles, and a directory of names, addresses, and comments ("LIKES TO THINK HE IS GETTING A DISCOUNT . . . NO CREDIT—KNOWN TO SKIP TOWN") that will also print mailing labels and maintain a list of phone numbers. These are actually fairly handy, although a bit complicated to create.

The program has two ways of hunting down information: slow and slower. You can specify only 30 key words per file; to index data after that you have to do string searches screen-by-screen. Key word searches are not too bad since they use an index on the disk; to look for a particular

YOU CAN TYPE characters directly from the keyboard to the printer to give your printer special commands, or type titles on a page.

set of characters one screen at a time might take until December 1999.

But there are many intelligent features as well. The page default when printing out a file is 22 lines, allowing three screens to fill each printed page. Backing up a data disk compresses all your information into the smallest possible space. When printing out screens you are offered the option of including or ignoring template headings. A gatefold page in the manual charts the operational flow of the operation of the program and spells out all the options. You can type characters directly from the keyboard to the printer to give your printer special commands or type titles on a page.

On balance however, the unnecessary complexity, need for multiple keystroke commands and separate disk formatting, restrictions on file sizes, and overall sluggishness make this just one more program that will be swept aside by forthcoming generations of flexible, speedy, friendly software written expressly for the PC and its successors.

Superfile
FYI, Inc.
4202 Spicewood Springs Rd., #204
Austin, Texas 78759
(512) 346-0133
List Price: $195
Requires: 64K, two disk drives, 80-column display and any standard word processor.

Superfile is a "back-end" database manager with several sterling qualities and one rather unsettling premise. It doesn't allow you to enter data through the program itself; instead, you input your information through *WordStar* or *EasyWriter* or some other word processor that produces ASCII or quasi-ASCII files; then you use *Superfile* to massage your data.

This allows you to index letters as you write them, print them out using your word processor, then sort and file them away with *Superfile*. Its authors created the program this way because they realized any other data entry method would essentially force them to create their own word processor. This would have increased the cost and complexity of the package, and was probably unnecessary, as most potential users already have a word processor.

Superfile has one of the most sensible manual formats on the market. You can actually learn how to use the program in 10 minutes. The documentation steps you unerringly through both the simple demonstration provided, and the subtleties of each command. And it presents the instructions in a fairly foolproof manner. However, the manual measures 8½- × 11-inches rather than IBM's standard 8- × 9½-inches, and its printing job won't win any gold medals.

SUPERFILE HAS one of the most sensible manual formats on the market.

Each double-page spread is divided into three sections. The left third of each spread shows exactly what appears on your monitor when the program asks you to do something. The middle third tells you precisely how to respond. The right third explains what is occurring, how many options you have, what the parameters are in each command, and what will happen next. This is a clear, tidy way to teach operation of a program. Every page is well-labeled, and the comments are well thought out and very friendly.

One glaring problem, however, is that *Superfile* was obviously translated quickly from CP/M. The manual opens with a special note to IBM users instructing them to "ignore all references to CP/M, and simply use DOS 1.1." This doesn't matter much when the manual refers to CP/M peripherally, and some of the more important changes have already been made on the disk. For instance, the manual lists an option on the main menu as "Return to CP/M," but on the disk (and on your screen), you'll see "Return to *operating system*." However, there are places where this is not consistent. After you've stepped your way through the initial demos you're congratulated and then instructed to "PIP" your copy of the main program. MS-DOS beginners might waste hours scrambling through their manuals in a futile effort to learn what this means.

Superfile commands require single keystrokes only. You can tap your way through a series of hierarchical menus in a second or two; many programs on the market require that you first hit a key to select an option, then hit Enter. *Superfile* is generally very fast. It will sort through 100 items a second, checking against any tangle of *ands*, *ors*, and *nots* you propose.

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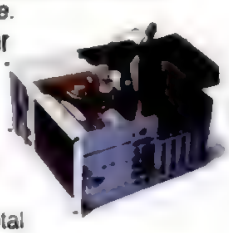
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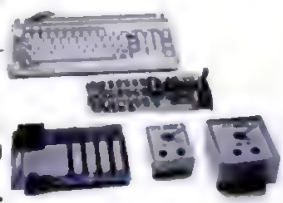
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Paper Tigers

The program allows you to use hard disks, and includes a straightforward program customization module to handle problems such as odd printer requirements or nonstandard screen sizes. *Superfile* even lets you run the program in reverse video if you want. Other utilities provide you with sorting, merging, file splitting, file renaming, and character replacing capabilities.

The manual is chock-full of well-illustrated examples and suggestions for ways to use the program, as well as lessons and theory on setting up an efficient database. Oddly enough, it asks you to create a paper-and-pencil log of key words; the first rule in its "Guidelines for Managing Information" is to "keep notes." This may reduce errors, but many computer users question the need to maintain separate hard copy files. Why couldn't such a log be set up electronically?

Another cavil is that certain file markers need to be typed in as uppercase characters. This shouldn't be necessary. And, since the program uses a slash (/) to separate key words, you can't insert a slash within a key word. CP/M must be written as CP-M. Why couldn't the program's authors have used a backslash (\) instead? Finally, if you're turning a long phrase into a key word, you must not let it "wrap" from the right side of the screen to the left, or the program will index it as two distinct key words. These bugs are all identified in the manual, however, so you are sufficiently warned about them.

The manual contains a directory of error messages, a glossary, and a decent index. Most operations described in it are preceded by half a dozen caveats, introductions, organization indexes, samples, setups, and sections describing the "flow" of procedures. By the time you get to the operation itself, you feel as if you've been thoroughly briefed by a government intelligence unit.

Full of Routines

If you search for a key word that is not in the index, the program will offer you several other key words with similar spellings, a handy feature. It will also do fast wildcard searches, where you give it certain characters and ask for all key words that contain that sequence of characters.

Superfile is full of other routines and utilities to search, sort, and manipulate information, and can perform a wide range of data handling operations. However, it does not update files very well. FYI is about to release an improved version called *Superfile System 3 (SS3)* that will handle updates with ease. *SS3* will also allow 65,000 key words rather than the 3,000 allowed in *Superfile 1*. It will double the number of key words you can string together in a logical search from 64 to 128, and the number of key words per record from 250 to 500. A new simplified operation will re-index all records in the entire database. *SS3* will come with an optional utility to sort and bang out mailing labels.

BY THE TIME you get to the operation itself, you feel as if you've been thoroughly briefed by a government intelligence unit.

What *Superfile*—and every other database—really needs is a utility to perform a word frequency analysis of each record. This would allow users to see which words occur frequently enough in their text to be candidates for key words. If such a feature were menu-driven, the user could scroll down a list of frequently-used words and turn any of them into key words with a single keystroke. In addition, *Superfile* would be far easier to use if key words could be entered with a single keystroke as the user was entering text.

A Snappy System

A search feature that would search by *string* in addition to key word (as in *Visidex*) would also be helpful. And there is one glaring flaw in this package: If you make changes in any one record, you have to re-index the entire database. You can add a new record with revised information that will be reflected in the index, but you cannot delete the incorrect record from the index.

In short, *Superfile* is a snappy information manipulation and retrieval system with a much clearer than average manual and several fairly advanced features. It is not a full-fledged database however; you have to enter information using a word processor that creates ASCII files. It allows you to file, index, and cross-reference documents *as you create them* with such popular programs as *WordStar* or *EasyWriter*. It even lets you design your own templates for such word processors, which makes data entry fast and easy. It handles records of any length up to 255 disks, and interfaces neatly with *Mailmerge*-type programs. With one or two minor improvements *Superfile* just might live up to its name.

The Foresight Data Manager
Foresight Software
P.O. Box 5196
125 East Carpenter Freeway, #660
Irving, Texas 75062
(214) 556-1251
List Price: $199
Requires: 128K, 2 disk drives, 80-column display.

OK, I have to admit, this program really piqued my curiosity, You've probably seen the advertisement: an Einsteinean curved-space checkerboard retracting upwards into a vanishing point of puffy cumulus clouds from which a handful of bouyant carved wooden letters spill out at crazy angles. Well, if the software didn't make it, I could always hang the picture on my wall.

I was also wondering what kind of software comes from a post office box on a Texas freeway in a town named "Irving." When I first saw this address I scrutinized the cover of the magazine I was reading to make sure it wasn't a *Mad* or *National Lampoon* takeoff. When I opened the manual I almost had to check again.

Who writes these things? This one opens with: "Welcome to an exciting, new world of information management for you." I could hardly wait. After a short section plugging the package's various features (some of which, I admit, sounded pretty terrific), the purple prose picked up again: "Gardeners can create 'Plant Identification Cards.' Football fans can create

WHAT KIND of software comes from a post office box on a Texas freeway in a town named "Irving."

their own 'Player Specs Profiles.' How will you use your *Foresight Data Manager*? Your only limit is your imagination." I reached for the Dramamine.

"Hot Enough for You?"

Maybe the actual instructions were clearer. I turned the page. Nope. The first set, on getting started, refers befuddled novices to Section 2 in the IBM manual; then it warns: "Make sure your computer is operating properly before you insert your *Data Manager* program. A computer that is overheating or has some other problem might damage your diskettes." Perhaps this is to get the company off the hook if the program doesn't work. You're having problems? Could be your computer is overheating. Have you tried immersing it in ice water? Or maybe a frosty bottle of Lone Star? Then more effusive lingo: "After you are comfortable with your computer, you must perform a favor for *Data Manager* . . ."

At this point I thought of giving the software the heave-ho and digging into something easier to work with, like *Easy-Writer 1.0*. But I slogged on; things were getting amusing. First thing the program does is ask if you want to change any of the system options. And it makes you hit an Enter after the Y or N—a bad sign.

Monochrome vs. Black and White

Another bad sign: One of the questions *Foresight Data Manager* asks is whether you have a color or monochrome monitor. I stopped and ran the program on a color monitor to see what the display would look like *before* I instructed the program to change from monochrome to color. The image was strictly black and white. So I reran the installation program, and at the proper prompt told it to switch to color. Then I ran it on our RGB color monitor. The image was still strictly black and white. This did not bode well. Since black and the IBM gray/white are hard to read on a color monitor, I reconfigured the program for mono and answered all the other installation questions. The disk groaned and hummed for a few seconds and then printed a line in the middle of the monitor: "Mount Program Diskette #1." I could almost smell the dusty Texas rawhide. "OK, boys, mount 'em up and move those PCs out. Yippee-ti-yi-yo . . ."

Following the directions, I copied the files onto a formatted disk. One small problem: these are b-i-g files. The good ol' boys who wrote them used good ol' compiled BASIC, which often produces miles of code for even the simplest operations. The package we were sent came on double-sided disks. If you have single-sided drives you're in b-i-g trouble. If you have bad sectors on the formatted disk you're in b-i-g trouble. And you have to wedge DOS in beneath them. It was a tight squeeze, but I finally made it.

This didn't seem right. IBM sold a whole lot of PCs with ludicrously inefficient single-sided Tandons; what were the unfortunate owners of these anachronisms supposed to do? I called the manufacturer to find out. Well, shucks, turns out there's a single-sided version too. Didn't know that. Didn't see that on the packaging. Reckon that's hell bent to cause a passel of confusion.

To show how the program works, *Foresight* includes a sample personal address file. To set this up, you have to type in several long file names. If this were illustrative of how other operations in the program worked I could accept the need for excessive keystroking. But there's a parenthetical note along with this exercise that reads "this procedure is ONLY for use with the Personal ADDRESS example file." So why didn't they include a batch file to do all the disk copying automatically? OK, the disk was tight, but they could have added a 128-byte batch file that does all the work. Or they could have used shorter names, or instructed the user how to copy files using wildcard symbols like *. But no.

So you spend a few minutes shifting files from disk to disk and then type in MENU and voila—a shining inverse-video logo blooms out onto the screen. Now I don't know about your PCs at home or work, but we've put a few miles on these babies in our office, and the phosphor on our IBM monitors has been scarred by the reams of text that have spun giddily down the screen. So when something pops into the eerie deep-sea floor luminescent green inverse video, we see the ghostly 80-column-by-24-row pockmarks left by various incarnations of *WordStar* and worse.

Polish or Perish

I have a friend who says you can tell right away whether a piece of stereo equipment is decent or not by its knobs. If the manufacturer wants to skimp, he usually slaps on some dreck made in the Fiji Islands. If he's producing a high-quality package he'll spend the extra few bucks and screw on something precision made out of brushed brass that's damped and hand-milled. Little things like that can really clue you in about the overall quality. This shows in packages like *The Desk Organizer* where even the smallest details have been pondered over and polished. But The *Foresight Data Manager* is another story.

The bottom of the screen contains a menu displaying the uses of seven function keys. Well, that looks promising. Above it is a pulsing message to choose an action. So you hit one of the function

YOU CAN tell whether a piece of equipment is decent or not by its knobs.

keys— and the whole intricate logo and inverse-video image scrolls up a line. Not the end of the world, but not very classy either. You want to hear more? The menu at the bottom of the screen is a good idea, and the manufacturers should be congratulated for making such extensive use of the function keys. But they're not listed in the conventional way.

On the PC keyboards we have in this office the function keys are each proceeded by an F. So the first key is F1, the second F2. However, in this program, the menus ask for 1 or 2. OK, small problem, but it is confusing. Even more confusing is that

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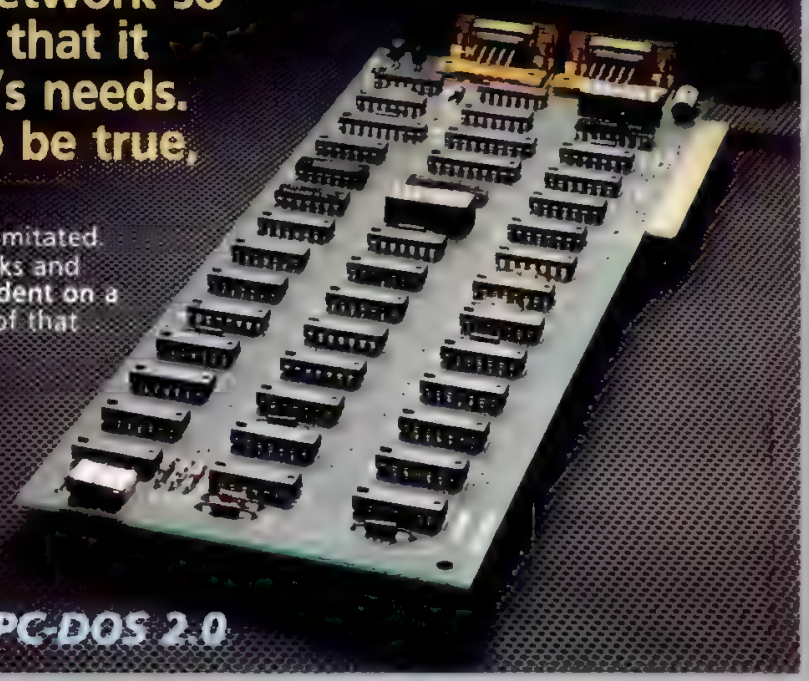
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CIRCLE 464 ON READER SERVICE CARD

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THE TOASTER is a hard disk sub-system containing TWO REMOVABLE 3.9", 5 megabyte cartridges. THE TOASTER provides unlim[ited] storage and conveni[ence] back-up with to[tal] portability. V[ery] speed a[nd] disk [capacity]

THANK YOU FOR YOUR OVERWHELMING RESPONSE!
We are substantially back-ordered on TOASTERS. We appreciate your patience!

XCOMP

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CIRCLE 455 ON READER SERVICE CARD

some screens provide ten menu choices, and label the tenth choice "0" rather than "10." At least these function keys don't have to be followed by an Enter. Virtually everything else in the package does. Why? It's easy to program one-keystroke responses in BASIC. The Enter key makes sense only when the user may need to enter responses of different lengths, for example 2 or 22. But Y or N?

Bugs Galore

So I figure that maybe if I dig into the actual guts of the program it will get better. I follow the directions, then experiment to see what happens if I change my mind and scoot around between menus. Trouble. The first template bangs up onto the screen over the company logo. The length of each field is indicated by an inverse-video bar. I'm staring at a message that says "Field Type: Alphanumeric . . . Select Function:" but there's a half-obscured logo peeking out from under several of the fields and a gaping "Version 1.0" smack dab in the middle of the screen. And no labels on the fields. OK, I didn't follow directions to the letter. Neither do many software purchasers. Programs should be written to take such errors into account and either flag them with a warning message, or not budge from the menu unless the absolutely proper sequence of instructions is given.

The function keys bounce you from one field to another. Well, bounce isn't exactly the right word; that implies speed.

THE WHOLE process is achingly slow, with many checks and options.

Worse, the program shows which template field you've selected by inserting gray block characters over the appropriate inverse-video bar. Jump from one to the next and the program erases the gray block characters from the old field and puts them down on the new one you've chosen. Except when you work your way down to the bottom one and then hop up to the top. Sure, it lays down the gray on the top row. But it forgets to wipe it off the one below. And it doesn't discriminate. Crawl to the bottom and the top field fails to erase.

Multi-Strokes for Different Folks

It doesn't get any better. You move from field to field by hitting the Enter key, which is a good feature. But the whole process is achingly slow, with many checks and options, each of which has to be answered by entering a one-key response and then hitting the blasted Enter. On top of this, while the program is smart enough to check for duplicate entries if you tell it to, it won't check until you've entered the entire screenful of data and answered all the required multi-stroke questions. If it's going to make a duplicate-file check, it should do it as soon as you enter the field it checks against. Finally, when it spots an unwanted duplicate entry, it instructs you to "re-add with unique key." This is technically correct, since the program calls the input phasing "adding," but it could be made clearer.

Again, to the program's credit, one function key will call up a help menu—and there are different help menus for each command level. But when you return from the help screen, which doesn't go into enough detail, the cursor is always in a different field from the one it was in before you asked for assistance.

The manual is liberally sprinkled with caveats, in forboding blocks of underlined or uppercase text, such as: "DO NOT ATTEMPT TO EXECUTE DATA MANAGER PROGRAMS DIRECTLY . . ." or "DO NOT TAMPER OR DELETE THIS DIRECTORY OR YOU WILL LOSE ACCESS TO YOUR DATA FILES." or "A 'RETURN' WITHOUT A FIELD # CAUSES THE PROGRAM TO SKIP TO THE NEXT LINE OF THE LABEL. THE PROGRAM DOES NOT ALLOW YOU TO RETURN TO A PREVIOUS LINE." It is a real plus to be warned about incipient problems like these. But it would have been far better if the Foresight designers had created safeguards and enhancements in the program to take care of such glitches.

Manual Labor

The early sections of the manual are fairly clear and readable. But as it begins to talk about the program's options (of which there are many) and functions (which seem unduly complex), the prose knots and eventually chokes. The manual is well-illustrated and decently organized, but it moves in fits and starts. It contains

THE MANUAL is liberally sprinkled with caveats, in forboding blocks of underlined or uppercase text.

all the information you'll need on operating the programs, and proceeds in a logical order, but is hard to get through; you won't confuse this with an IBM manual. Its author is well-informed and well-intentioned, but is not, I would guess, a professional manual writer. This package was represented as something a busy executive could use without too much trouble. I'm skeptical.

The program does have its good points. But invariably they are obscured by drawbacks. The template creation program, for instance, is very well-designed and simple to learn and use. It centers headings automatically, gives you many intelligent options, and provides a grid that lets you set up your data fields precisely and attractively. But to get to it you have to first stop what you're doing and go to the menu, watch the main inverse-video logo flicker slowly onto the screen, and hit a function key, only to be told to "mount" another disk.

Faint Praise

In fact, the program contains many praiseworthy features, but even more that need work. Safeguards abound to prevent you from losing or overwriting existing files and templates, but these can be nuisances, and require too many keystrokes. You can define the relative importance of each field for subsequent retrieval; in fact, the program won't work unless you do. There is a profusion of help screens that know where you are in the program and

offer specific explanations, but some of these could be more informative and less filled with jargon. You can, in some instances, zip from operation to operation quickly and without disturbing your data; in others you have to switch disks, reanswer the same questions, punch in extraneous keystrokes, etc.

HELP SCREENS know where you are in the program and offer specific explanations.

The search feature is very powerful, but extremely abstruse. To hunt for a record, you "inquire into" it by hitting a function key. A "Screening Criteria Function Key Panel" (otherwise known as a menu) gives you the usual panoply of logical choices with its array of =, <, and > signs and all the permutations of these. There is one menu selection, "range," that I still haven't quite figured out. Part of its explanation is:

Given these two sets of characters, the Data Record Key Field is compared twice. For the LOW value, you enter the character(s) to be used in the => comparison. After you enter this data and hit Return, Data Manager will then PROMPT you to enter the HIGH Range value. Enter character(s) to be used in the <= comparison. If, for example, in an alphanumeric field, you enter 'D' or 'd' in response to the LOW Range value PROMPT, and 'R' or 'r' in response to the HIGH Range value PROMPT, Data Manager will consider ONLY those Data Records in which data in the corresponding Key Field is either between or equal to one of these values (see Notes 1 & 2).

I wonder when they're coming out with the English version of this.

A Sound Feature

Foresight Data Manager includes a nifty feature called "sound" that will search for records you don't know how to spell properly. If you remember that you entered a file for a client named something like MacGrumble or MacGrimble or McGremble or McGrymbel, you can use this to strip out the vowels and hunt for anything that "sounds" like MKGRMBL. Very useful and decently-implemented.

You can also look up records by record number, or do selective string searches within data fields. This last option comes in handy when some of your fields are code lines packed with alphanumeric data. For instance, if you code all your female customers who first purchased something from you in 1982 and bought a book on petunias F82BKPET, you could pull out all your female buyers by hunting for the F, or petunia book buyers by hunting for the BKPET, etc.

Foresight Data Manager can produce a wide variety of forms and labels, although, as the manual admits, "the report generating process may appear, at first, to be quite involved." They weren't just whistling Dixie. The complexity is a function of the formatter's power and flexibility. You can pretty much put any information from any files anywhere. But don't expect to churn out sophisticated reports without taking the master's degree outputting (and offputting) quasi-tutorial in the manual. One bizarre note is that in this and only this process, certain operations do not need the excessive double keystroking found elsewhere in the program. In fact, you can throw the report generator into a tailspin by hitting Enter.

Cold Calculations

The report function can perform calculations on data lists and tables automatically—very nice. There is even a way to take the results from initial calculations and use them in subsequent mathematical operations, giving you the equivalent of a very primitive electronic spreadsheet, although VisiCorp and Sorcim won't be quaking in their boots over this particular implementation.

One of the package's best—but thorniest—features is its ability to print out data in precise locations. This allows you to fill in preprinted forms, form letters, and invoices. But the fat section on how to put this particular "multi-line" formatter through its paces makes the rest of the manual look like a McGuffey *Reader*. The busy executive will probably take one look at this and hand it over to an assistant he doesn't particularly like.

In theory, a label generation module should be fairly straightforward. After all, how unwieldly can something that prints out a few lines of names and addresses be? The manual starts off its labeling explanation by telling the user: "Just follow these instructions for a foolproof Label everytime"—and then assaults him with 19 detailed steps sprawling over six single-space pages. Still, everything will work if you persevere.

YOU CAN throw the report generator into a tailspin by hitting Enter.

The package includes a slate of utilities for altering the hierarchy of key searches, importing "foreign" data files (with documentation chock full of screaming boldface warnings and terse DBMS arcana that is not for the fainthearted), and reorganizing a file—merging it with a different file, adding fields, or changing formats. You receive a lengthy glossary (believe me, you'll need it), and a brief index.

On Computer Boot Hill

The Foresight Data Manager could function as a desk organizer. So could *dBase II*, or for that matter, two cardboard boxes and a scratchpad. But the programs contained in it are much better suited for the accounting or order departments. It is a somewhat powerful and flexible garden-variety database manager with one or two nice touches. But it is user-hostile in many places, and its manual borders on the inscrutable.

Once you master it you can store and retrieve data fairly well, but in this case getting there is not half the fun. The program doesn't have the power or speed of the major league database managers, and is too complex and ornery to placate an impatient executive who might want to use it to organize his daily routine. In any showdown with the other desktop database managers on the market, this one in its present form will end up on computer Boot Hill. */PC*

ONE MEGABYTE MEMORY



Technical specifications:

Maximum capacity	512K Bytes
Memory device	64K dynamic RAM
Card Size	4.2" x 13.3"
Maximum supply current	500 milliamperes
Maximum access time	275 nanoseconds

JRAM is fully assembled and tested.
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TALL TREE SYSTEMS

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CIRCLE 497 ON READER SERVICE CARD

It took hundreds of years to build the world's most advanced spreadsheet.

Way back in 1534, a Venetian scholar wrote a text that standardized the techniques of modern bookkeeping. And up till 1979, there weren't a lot of real improvements in the way people did spreadsheets. You still had to enter all your figures by hand. Run all the totals yourself. And when you had to make a few changes, you had to run the totals all over again.

Then along came a program that let you create spreadsheets on a personal computer. Without touching a pencil. Or adding anything by hand. Best of all, this new program gave you the freedom to look at your balance sheet a dozen different ways if you felt like it. Because all you had to do was change one figure, and the computer would refigure everything else for you. Automatically.

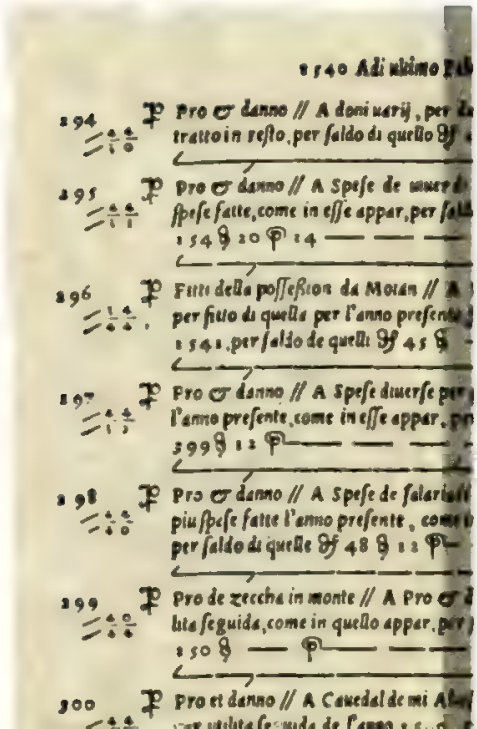
Like most breakthrough ideas though, this original spreadsheet program had a few things that definitely needed improvement. For instance, all the columns had to be the same width. And the entire system took about 20 hours to learn.

So we developed SuperCalc,® which was such a giant step in the right direction that it became a best-seller. Over 250,000 copies in only 18 months.

Today, we've gone even farther. After talking with thousands of customers, we've found a lot of important new features you'd like to have. And we've built them into the world's most advanced spreadsheet.

SuperCalc².

1534



1979

STATEMENT

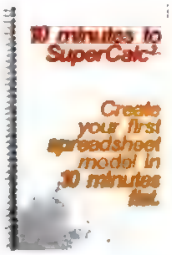
	JAN	FEB	M
SALES	1000	1100	
COST	300	330	
GROSS	700	770	
R & D	160	176	
MARKETING	200	224	
ADMIN.	140	151	
TOTAL	500	551	
INCOME	200	219	
TAXES	80	88	
NET	120	131	

1981

INCOME STATEMENT

NET SALES	1
COST OF GOODS SOLD	
GROSS PROFIT	
RESEARCH & DEVELOPMENT	
MARKETING	
ADMINISTRATIVE	
TOTAL OPERATING EXPENSES	
INCOME BEFORE TAXES	
INCOME TAXES	
NET INCOME	

It'll take you 10 minutes to learn it.



With SuperCalc² you get all kinds of features that have never been possible before. Like custom formatting capabilities. Automatic consolidation. Sorting. And more. Take a look at the spreadsheet below, and you'll see just how much we're giving you.

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So. If you've always thought there had to be a better way to do your spreadsheets, stop by your closest computer store. And take a good look at SuperCalc² After just 10 minutes, you won't want to do one more spreadsheet the old way.

1983

Combines any number of spreadsheets —automatically!

Calendar/date capabilities.

Percentages.

```
COMPANY CONSOLIDATED MONTHLY PAYROLL

Today's Date                    4/15/83        Deduction Percentages
Payroll Start Date              4/ 1/83        Fica              6.700%
Days this period                   15          SDI                .8%
Recalculate YTD Y/N ?  N

                                          Gross       Total         Net          YTD
 Emp#  Employee name      Status          Salary      Deduct        Pay          Gross
=============================================================================================
  34   Adams              M          $1,100.00  ( $82.50)  $1,017.50    $6,200.00
  49   Beckette           S            $750.00  ( $56.25)    $693.75    $5,250.00
  84   Johnson            S            $850.00  ( $63.75)    $786.25    $5,950.00
  92   Jones              M            $900.00  ( $67.50)    $832.50    $6,300.00
  12   Samson             S            $560.00  ( $42.00)    $518.00    $3,920.00
  19   Santos             M            $650.00  ( $48.75)    $601.25    $4,550.00
  45   Smith              S            $700.00  ( $52.50)    $647.50    $4,900.00
=============================================================================================
Total # employees          7

Total Gross Salaries (100's)          $55.1
Total Deductions (100's)              $-4.1
Total Net Pay (100's)                 $51.0
```

User-set decimal places.

Floating $ signs.

Embedded commas.

Negative numbers in ( ).

Arrange reports numerically or alphabetically, like this

Numbers in 100s or 1000s.

SuperCalc²™

SORCIM

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City_____ State_____ Zip_____

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1040 EZ	2119
1040 page 1 & 2	2210
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Schedule B	2441
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Schedule E	4137
Schedule F	4684
Schedule G	4972
Schedule R/RP	5695
Schedule W	6251
1040 ES	6252
1040 SE	

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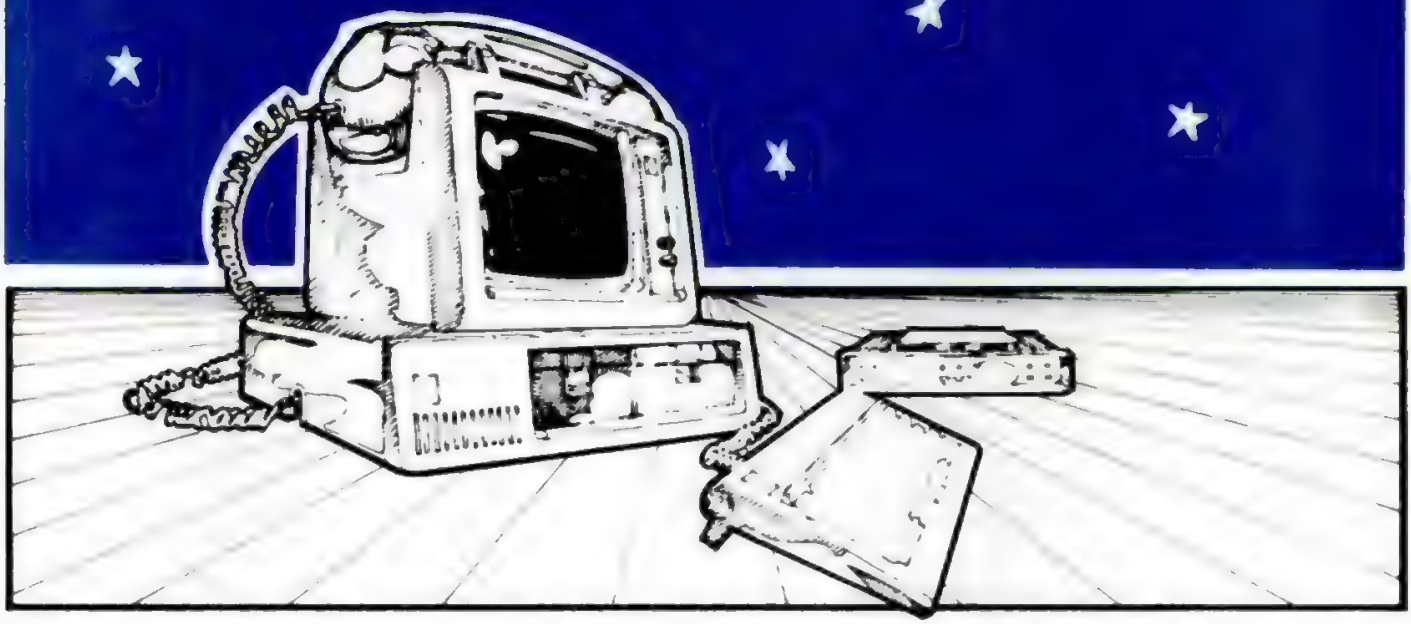
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WHO NEEDS PCAT?

- Retailers
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- Stock, bond and commodity brokers
- Wholesalers and distributors
- Customer service or support depts.
- Real estate agents
- Accounts receivables depts.
- Collection agencies, etc.

HARDWARE REQUIREMENTS

IBM Personal Computer with 128k, at least one diskette drive, 80 column monochrome or color monitor, and a Hayes Smartmodem or Novation Smart-Cat. Printer is recommended.

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CIRCLE 125 ON READER SERVICE CARD

Have someone call me: I'm interested
Please send me written information

NAME: _____

ADDRESS: _____

CITY _____

STATE: _____ ZIP: _____

PHONE #: ( ) _____

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IBM EYE/KATHLEEN BURTON

In a bold move to counter Japan's imminent plunge into the international market for personal computers, IBM has begun a sophisticated campaign to promote its "5550."



Over There: IBM In Japan

He is everywhere, gazing out from subway walls and billboards, murmuring sultrily on Japanese TV. He is Kioshi Atsumi, the most popular movie star in Japan today, the personification of IBM's new image, customized for the Japanese market.

Long the bastion of conservatism in the United States, IBM has adopted a decidedly different image in Japan. With the announcement of its new 5550 "multiwork station," IBM is targeting the Japanese market for word processing, personal computers, and intelligent terminals—terminals that can communicate with other IBM host computers. The company has enlisted Atsumi to kick off what it hopes will be a buying craze for the 5550 in the Far East.

In a Blue Fedora

Atsumi is best known from the *O Toko Tsurai Yo* films. (Loosely translated, this means "A Man Is Miserable.") The Japanese commercials featuring the star are punctuated with English voiceovers along the lines of "IBM—Go, Go, Go, *Man!*" In the ads, Atsumi appears, replete with blue fedora, velvet cravat, and pinky ring—resembling nothing less than a gigolo. This image is a far cry, however, from what he actually represents to the Japanese people.

To the Japanese, Atsumi is a cross between a non-intellectual Woody Allen—who always loses the girl—and a less than slick Dustin Hoffman. He is a "man with a heart," according to Japanese waiters, busboys, and shopgirls. He is one of them, a man of the people. And if Atsumi can be elevated to elegance via the IBM "class machine," perhaps they can too.

A Media Blitz

IBM's sizable commitment in Japan is underscored by its choice of Atsumi as the focus of a 5550 media blitz that is soon to reach full force. The company took another big risk 2 years ago, when it shifted



Japan's most popular movie star, Kiyoshi Atsumi, enlivens IBM's image in Japan's computer marketplace.

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focus and marketing direction in the United States with the introduction of the PC.

IBM is still feeling the impact of the FBI-Hitachi "sting" operation (or "accident," as the Japanese businessmen delicately refer to it) earlier this year. Having lost market shares in small business systems and personal computers to the powerful Japanese conglomerates Fujitsu and Hitachi, IBM occupies an uncertain position in Japan right now.

The sting resulted in a serious loss of face for Hitachi, which had commissioned several of its employees to secure classified information about IBM products still on the drawing board. In Japan, however, the consensus is that the Japanese sense of pragmatism far outdistances the memory of such matters. "A rumor lasts only 75 days in Japan," was K. Nishi's reply when asked to comment on the spying operation. Nishi is CEO of ASCII Microsoft, the Far East representative of America's Microsoft, headquartered in Bellevue, Washington.

Recent indicators point to IBM's readiness to play hardball for high stakes with the Japanese—on their own turf. This willingness is apparent, not only from the upcoming marketing blitz for the 5550, but also from IBM's recent introduction of its English language PC, a joint venture flirtation with Matsushita Industrial Electric Company, and IBM's hard-line stance with Hitachi.

Inside The IBM 5550 "Multiwork Station"

IBM's effort to battle the Japanese for markets on their own ground depends on the flexibility of their star contender. The 5550, the focus of IBM's current sales crusade in Japan, uses a 16-bit Intel 8086 microprocessor. The machine features 256K RAM, which can be expanded to a maximum of 512K. The system uses a double-sided, double density, 5 1/4-inch disk, with a capacity of 640K. Options for the 5550 include a 128K memory adapter, an adapter for magnetic stripe reader, and two communications adapters—Systems Data Link Control/Bisynchronous (SDLC/BSC and /ASNYC) and Control Asynchronous. A self-diagnostic mechanism locates functional hardware problems automatically.

Three display options are available for the 5550: two monochrome displays, 12-inch and 15-inch, and a 14-inch color screen. Up to 2,048 alphanumeric characters can be displayed, as well as 1,024 Japanese Kanji characters. The three available matrix printers include a model that prints 16 x 16 dots per character, another that prints 24 x 24 dots per character, and a high-speed model. The high-speed printer displays 24 x 24 dots per character, has options for single-sheet and continuous forms feed mechanisms, and can print up to 60 Kanji c.p.s.—*K.B.*



Working configuration of IBM 5550 "Multiwork Station."

THE HIGH-SPEED printer can print up to 60 Kanji characters per second.

Competitive Pricing

As the focus of IBM's new campaign, the 5550 looks like a decided winner. It has plenty of power at a competitive price. A low-end-version, which retails in Japan for about $4,100 in U.S. dollars, includes a printer, a single disk drive, and 256K of expandable memory. The high-end model, which sells for $14,000, comes with three disk drives, a built-in 8.1-megabyte hard disk, a high-resolution color monitor, 512K of memory, and a top-of-the-line high-speed printer. (The color monitor and hard disk features will not be available until December 1983.)

The 5550's competitive pricing is due to several factors, according to ASCII Microsoft CEO Nishi. First, IBM plans to sell the product in quantity to large Japanese-based international trading companies that have volume turnovers. Second, in a move that emulates the Japanese, IBM will settle initially for smaller profit margins. Third, like IBM's PC, the product is a hybrid, made up of parts manufactured by several different Japanese producers. These manufacturers are able to take advantage of highly automated facilities, resulting in low-cost production.

This is the first time IBM has relied exclusively on a phalanx of Japanese manufacturers, and industry-watchers predict similar joint ventures in the future. For the 5550 hybrid, Matsushita manufactures the system unit and monitor; Alts makes the Japanese Industrial Standard (JIS) Hiragana keyboard; and Oki produces the printers. Developed in a 2-year design project

by IBM Japan's Fujisawa Product Development Laboratory, the 5550 is being assembled at an IBM plant near Tokyo.

English Language PCs

In January, IBM introduced the English language version of its PC in Japan. However, according to Richard Morris, IBM Director of Communications in Japan, IBM is adopting a "wait and see" attitude with regard to its sales potential there. While the 5550 will be marketed through 40 Japanese "Dairiten" or dealers, including Nippon Office Systems, Kanamaso Gosha, and ComputerLand Stores, the PC will be retailed solely through ComputerLand Japan.

Since the beginning of this year, ComputerLand has opened five branches in Japan, including a high-profile store in Tokyo's ShinJu-Ku district (two-and-a-half million Japanese commuters pass this store daily on their way to work.) John Sake, Director of Japan's ComputerLand operations, reports selling out his first shipment of English-language PCs in 2 months. He has had to reorder, due to insatiable Japanese demand for the machines, which is somewhat surprising to

THE JAPANESE lag behind the United States by about 2 years in how they use personal computers.

IBM. This demand is surprising, not only because these computers are English-speaking, but because they are priced substantially higher—7-to-8 percent—in Japan than in the United States. This price variance is due to various import tariffs and a different overseas pricing strategy, according to Sake.

Fifty percent of PC sales have been to English-language-speaking Japanese businessmen and to Japanese universities that are evaluating the machine and using the computer to teach students to be programmers. The remaining 50 percent have been sold to Japanese-based U.S. banks and financial managers, who use it to communicate with their widely dispersed mainframe computers.

Pacific Overtures

According to IBM's Morris, the 5550, which is compatible with the IBM PC, is the key to IBM's office automation strategy in Japan. He says that IBM plans to market the 5550 in Japan in conjunction with the "Scan Master" image processor, another Japanese-made product. Indications are that other Pacific Rim countries are targeted for marketing of the 5550 as well. In the year ahead, Morris reports, IBM will introduce versions of the 5550 that have Korean, Chinese, and English word processing capabilities.

The IBM PC and the 5550 are both targeted toward the largely untapped Japanese professional and business markets, according to ComputerLand's Sake. As always IBM is stressing support and service as prime motivators to attract customers. IBM has established 27 service and maintenance centers throughout Japan and is offering a 1-year warranty on the 5550, to appeal to the high value that the Japanese business community places on reliability. (In Japan, the 6-month warranty is standard.)

IBM must compete with Japan's "Akihabara mentality" if it is to compete successfully against technology-driven Japanese microcomputer companies, says Sake. Akihabara is Tokyo's renowned discount shopping district that features Middle-Eastern bargaining and hawking, juxtaposed with every high-tech state-of-the-art consumer product currently known to man. In accordance with this tradition, Japan's microcomputer firms are accustomed to "paper-thin profit margins" and cutthroat discounting in their attempts to establish market share early in a product's life cycle.

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Figure 1: Sample of Japanese script generated by IBM 5550.

Mushrooms After the Rain

The Japanese say that IBM plug-compatible manufacturers are springing up as rapidly as "mushrooms after the rain." Each "mushroom" has established a highly specialized niche: NEC has targeted business-oriented personal computers; Hitachi and Toshiba are zeroing in on word processing; Fujitsu has garnered overall market share in mass-market personal computers.

The personal computer wave, however, has not yet crested in Japan. And, though there are over 20 manufacturers of personal computers, IBM's Morris claims that the Japanese lag behind the United States by about 2 years in how they use personal computers. He claims that non-business users consist almost exclusively of diehard hobbyists and an upcoming generation of Japanese "microkids."

Previous word processors were locked in mortal combat with the Japanese language. Their keyboards, according to Morris, were as large and unwieldy as dining room tables. They all had relatively inefficient methods of translating Japanese Hiragana characters (a Chinese-derived phonetic alphabet used for native Japanese words) into Kanji, the set of over 5,000 standard Japanese characters. (There is yet another Chinese-derived alphabet to contend with—Katakana, which spells out words borrowed from other languages, usually English.)

The 5550 surpasses its predecessors by selecting the most sophisticated Kanji, according to its context. Earlier Japanese word processors selected a list of five to twenty possibilities in Kanji, leaving the user to choose the correct phrase.

In its word processing mode, the 5550 is programmed to access a dictionary of over 40,000 Japanese words. Using its basic software system, it can recognize up to 3,418 characters. By using another piece of software on an extension disk, it can recognize up to 7,190 characters. The

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system adjusts to a specific operator's phrasing and can update and reprogram parts of the dictionary as needed.

As a terminal, the 5550 uses a 3270 *Kanji Emulation* program, which allows it to interact with IBM hosts, including the Systems 370, 4300, and 8100 information systems. Other available software packages include application programs for general ledger, accounts payable, and accounts receivable, as well as ASCII Microsoft's "Multi-Tool" package. The 5550 can also use BASIC, or high-level programming languages such as COBOL, FORTRAN, and Pascal, as well as the Macro Assembler.

IN ITS WORD processing mode, the 5550 is programmed to access a dictionary of over 40,000 Japanese words.

Plastic Cherry Blossoms

A sea of solemn, blue-suited Japanese watched the 5550 go through its paces at a 2-day IBM demonstration in Tokyo last April. Hanging like a totem in the huge reception hall was a giant poster of Kioshi Atsumi in his blue fedora. Plastic cherry blossoms were strung through the hall—a reminder of the live flowers that had not yet bloomed.

Across the room, monitors flickered rainbow colors, as bar charts were rapidly transformed into pie-shaped graphs. Young Japanese women dressed in turquoise uniforms speedily chirped their 5550 sales pitch in Japanese, their words punctuated with recognizable Anglicisms such as "print out." Delicately etched Kana script spewed from the printers, looking as fragile as a bird's footprints (see Figure 1). It appeared that the IBM 5550 would soon sweep Japan.

And Atsumi, watching silently from the poster on the wall, looked as if he might suddenly say, "IBM—Go, Go, Go, MAN." */PC*

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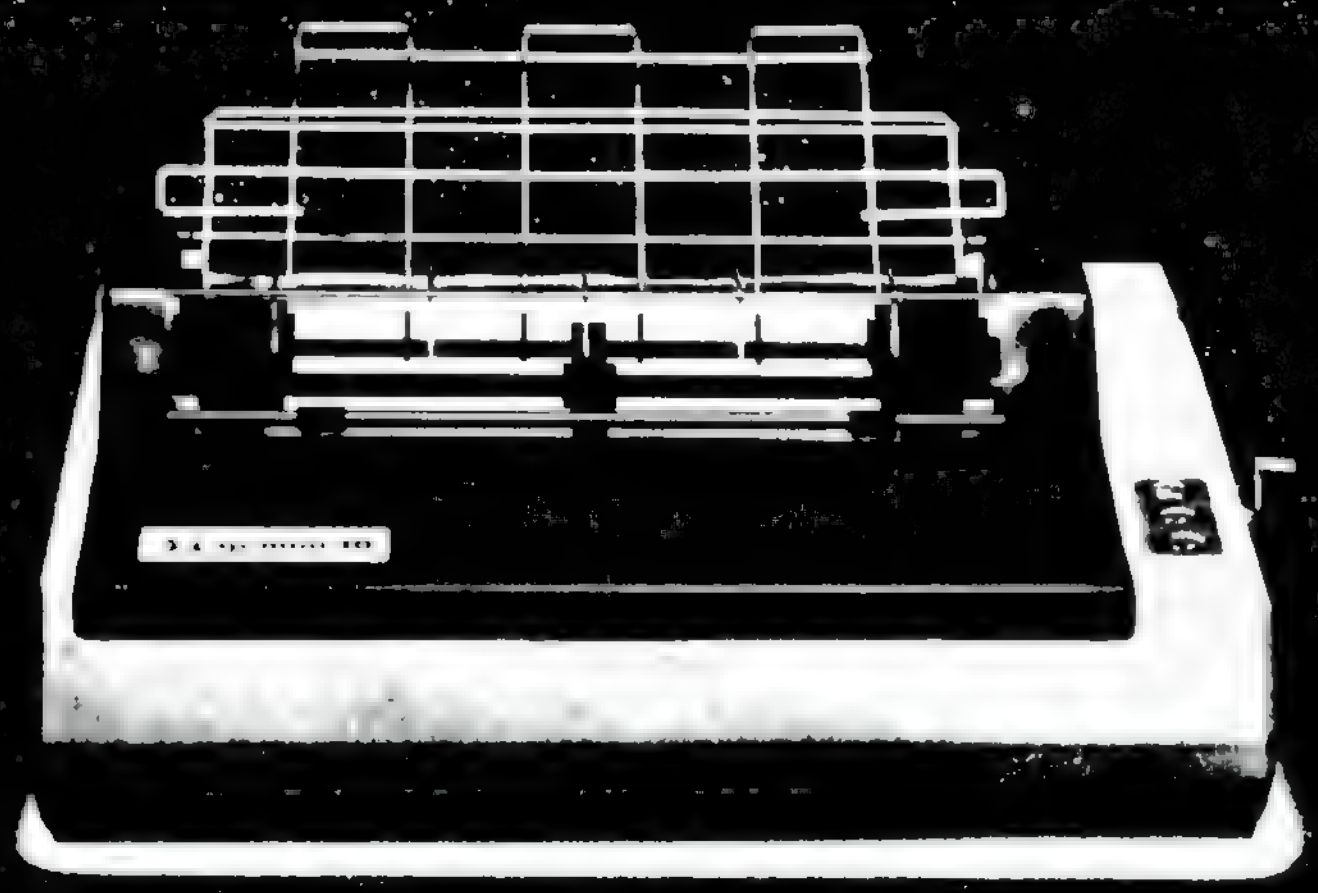
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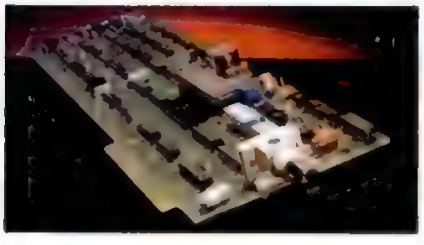


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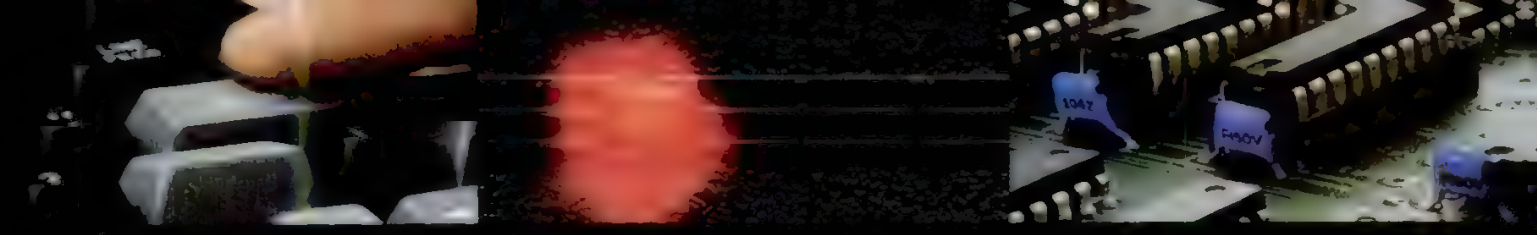
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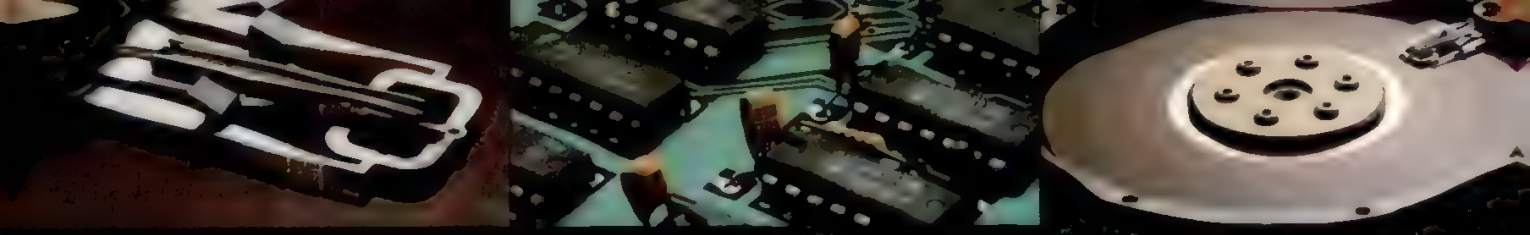
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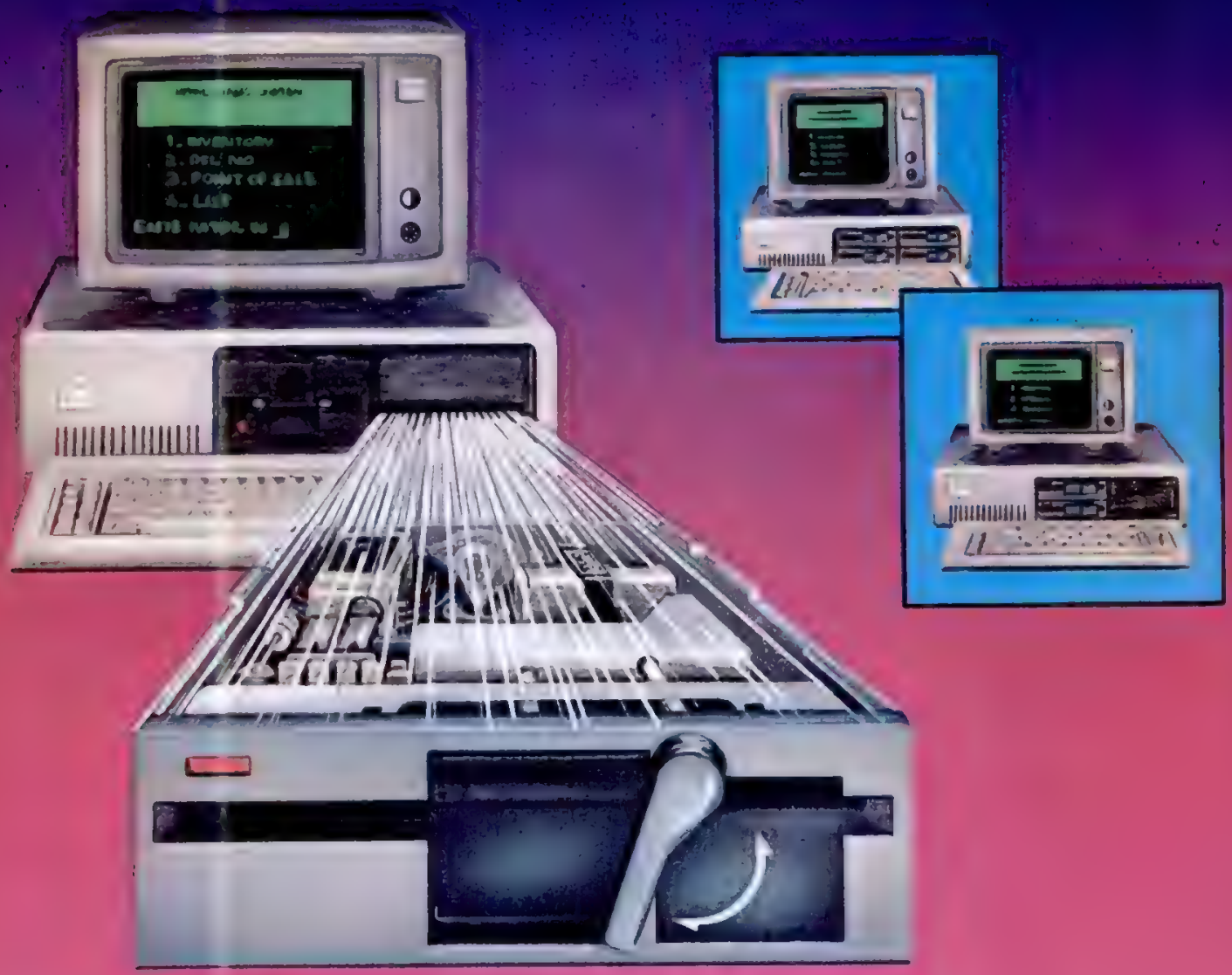
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Despite its additional features, this updated operating system leaves its users more bugged, bothered, and bewildered than ever before.

The Dark Side Of PC-DOS 2.0

When IBM announced the 2.0 version of PC-DOS, most of us in the community of PC users were excited and thrilled by the new features that it contained. But now that we have had a chance to work with the new version, we're discovering that there are lots of problems with PC-DOS 2.0. DOS 2.0 is young. Though I attempt to detail the trouble spots, the problems in PC-DOS 2.0 seem to be so plentiful that you can be sure of discovering more for some time to come.

A little background information might be in order, to put these problems into context. Creating a new release of PC-DOS posed some unique problems. Usually each change in a widely-used program like PC-DOS is evolutionary. An update builds on what has been done before: the program is improved and expanded, but not rebuilt. But the authors at Microsoft wanted to restructure PC-DOS so that it would take on much of the character of the popular UNIX operating system. Microsoft had good reasons for doing this—it wanted MS-DOS to fit into its plans for a family of UNIX-related operating systems. Microsoft's plans won't just benefit itself; in the long run this change will benefit users as well, because it will help our PCs fit into the future of computing in a smoother way.

I CAN SEE signs that IBM brought out version 2.0 in haste rather than slowly and carefully.

Thus, for the 2.0 release, PC-DOS had to be rewritten from top to bottom; the internal structure and philosophy of the operating system underwent a complete overhaul. The attempt to revolutionize DOS made it much more likely that errors would be introduced into the new version. Usually each new release of a program has fewer and fewer problems than past releases, partly because there is more time to carefully check for errors. But it didn't happen that way with this new PC-DOS. We know that creating PC-DOS 2.0 wasn't an evolutionary process, and I can see signs that IBM brought out version 2.0 in haste rather than slowly and carefully. Perhaps this is because IBM was in a hurry to introduce the new XT model of the PC, which required PC-DOS 2.0.

There are so many different kinds of problems with PC-DOS 2.0 that it is hard

Sabotage!

The author of The Norton Utilities tells of his near disaster in a compatibility gap lying between versions of PC-DOS.

When a new release is made of a popular operating system like PC-DOS, compatibility is all-important. It's essential that a new version of PC-DOS support all the features of older versions, so that existing programs will work with each new edition. This is the way it's supposed to be, and the folks who worked on PC-DOS went to great lengths to make 2.0 behave accordingly. Wherever they wanted to depart from the convention established by the earlier versions of DOS, they innovated by adding to convention, building rather than discarding. This preservation of the old ways accommodates programs that followed the rules for earlier versions of PC-DOS; they were assured of working with the new one. But there's one sticky exception, which amounts to an act of sabotage.

There are two PC-DOS services that programs can call on to read or write complete sectors from disks; these are known as "interrupts 25 and 26." Programmers who used these interrupts in the past noticed that there was a flaw in the way they were defined: they didn't lay out the best possible way to access a disk. They gave a workable way, but not the best way. For PC-DOS 2.0, these two interrupts were redefined and improved—except for the fact that any program that used the old scheme wouldn't work with the new, and vice-versa. This sabotages any program that uses either of these two services.

I am one of the near-victims of this change, so I have the luxury of being amused as well as appalled by what was done with PC-DOS 2.0. My own programs need the services provided by interrupts 25 and 26, but I had decided to use another means to get the same result: my programs happened to use similar services that were offered by the BIOS, built into the PC ROM. As a result, The Norton Utilities can still run under PC-DOS 2.0. The only restriction is that my programs won't work with disks in 9-sector format, the default now used by PC-DOS 2.0. (A new version of The Norton Utilities is now available that takes advantage of the additional functions in 2.0; this update can also be used with PC-DOS 1.1.)

I was lucky. I was spared the agony of being sabotaged by PC-DOS 2.0. Though the disk-based PC-DOS version of these services was the one recommended by IBM, I luckily chose the other method, so I got off easy. But what about those programmers who trusted IBM and Microsoft, and did things the official and approved way? They sure got a raw deal, as did anyone who uses the programs they wrote.

This brings up the touchy issues of compatibility and the integrity of IBM and Microsoft. Most of us have heard of programs that worked on the 1.0 version of PC-DOS, but didn't work with 1.10. In most cases, this happened because the programmers didn't play by the rules, the rules that are supposed to guarantee that a program will work with every version of PC-DOS. But when programmers are given rules to follow and IBM changes the rules in the middle of the game, we are all in trouble. The most unfortunate result is that now we don't know how much we can trust IBM and Microsoft to keep new and old versions of PC-DOS compatible.

I don't want to unduly criticize IBM and Microsoft. Given the massive reorganization of PC-DOS that was done for the 2.0 release, they did a very good job of keeping it compatible with older versions—except for their failures with these two services. Unfortunately, 98 percent compatibility isn't what we need—it takes 100 percent to make our programs work. And being 98 percent trustworthy isn't terrific either. —P.N.

to categorize them in a simple way. Some of them are out-and-out bugs. Some of them are just lousy human engineering, making PC-DOS less, rather than more, user-friendly. Some are errors in the documentation, and others are annoying inconsistencies—a feature will work in one part of PC-DOS, but won't in another, for no really good reason.

The Misleading Manual

The easiest and simplest place to begin is with the documentation for PC-DOS. There are typos, grammatical errors, and misleading information galore in the PC-DOS 2.0 manual—so much so, that IBM has already published a set of corrections to the manual. There is a very easy way to check if you have the corrections in your copy: turn to page xx of the table of contents. If you think you're seeing double when you look at the listing for Appendix K (about 10 lines are repeated), you do not have the corrected pages. Here is a guide to some of the other problems with the documentation.

THE FIND and Sort filters, however, are both unpredictable.

If you run across a new term, ASCIIZ, and can't find it in the index, look for its definition on page D-14. If you wonder at a claim that the FDISK command will do something that it won't, try FORMAT instead. Anything that looks like a factual error, probably is. If you have trouble making sense of Chapter 13, which discusses extended screen and keyboard control, you probably made the mistake of thinking that this chapter was intended to be an explanation. Actually it's a new feature of the PC-DOS manual, a sort of "can-you-figure-this-out?" puzzle. (There may be a prize offered to those who succeed.) The write-up for the new PC-DOS memory management services has also puzzled more than one experienced programmer.

Even though the PC-DOS manual has grown enormously in size, it neglects to mention many important changes and innovations in DOS. Relying on the man-

ual for guidance, you may fail to notice new features of subdirectories and paths. Here is one example that surprises almost everyone who stumbles onto it. If you are working on one disk, and set the "current directory" to one of your subdirectories, this is where PC-DOS looks for data files. Now if you change the default drive to another disk, naturally that disk's root directory becomes the current directory. So far so good; even the manual agrees. But then, if you switch the default drive back to the original disk, PC-DOS remembers the original current directory and points to it again. In fact, PC-DOS 2.0 seems able to keep track of a current directory for each disk drive. The documentation only mentions this fact, very quietly, in one place (pages 5-6) and never brings it up again, not even when discussing how to change the current directory.

The documentation for PC-DOS 2.0, like that of its predecessor, fails to mention a nice extension to the REM batch command. It's true that beginning a comment line in a batch file with a period works just as well as beginning the line with REM. This abbreviation of the REMark command is convenient, since it can be used to produce tidier and more attractive batch file comments without all those REMs cluttering up the screen.

Questionable Commands

As to more substantial problems, I've found, and heard about, plenty of them. The new PC-DOS "pipelining" feature includes a category of routines known as a "filter." PC-DOS 2.0 provides three filters, called More, Find, and Sort. Of the three, one works just fine: More. The Find and Sort filters, however, are both unpredictable. At times Find will report finding characters that aren't really there; its output can become so scrambled that it is hard to make sense of it when it appears on your display screen. The Sort filter has been known to report that it is out of disk space when it has millions of bytes of disk space available to sort a few hundred bytes of data.

Another distressing bug in PC-DOS concerns redirecting of input to commands. *PC Magazine* columnist Mark Zachmann discovered this problem. If you want a PC-DOS command that asks you for a reply to questions (such as the Format command, which includes prompts like "Format another ?") to work automatically rather than interactively, you can set up a response file, and use "input redirection" to tell the command to get its responses from the file. This is fine if all goes well. But if the command needs more responses than you put in the response file, things get hung up, and you can't use the Ctrl Break keys to solve the problem.

I'VE GOTTEN odd results with the Copy command when using it to copy several ASCII files into one.

Zachmann also discovered that an old bug from previous versions of PC-DOS still hasn't been fixed. Under the wrong circumstances, Debug can get hung up tracing a program, due to poor handling of the timer interrupt.

Besides the problem in using redirection for the input to PC-DOS commands, redirecting the output from PC-DOS commands also can lead to trouble. When the output from a PC-DOS command is put into a file, the file doesn't have the sort of tidy ending that a text file is supposed to have. This complicates the use of PC-DOS's redirection features.

I've also gotten odd results with the Copy command when using it to copy several ASCII files into one. So odd, in fact, that I haven't yet been able to nail down a real bug in PC-DOS—perhaps I've been doing something wrong. In any case, the results haven't always been what I'd expected. If you need to use the Copy command in this way, proceed with care and be prepared for surprises.

The check-disk command, CHKDSK, has some new features, including a report of when files are fragmented into several noncontiguous parts. (This condition can slow down access to your data.) But you should consider the report an approximation; it isn't always accurate. I've sometimes found that files aren't in the same number of pieces that CHKDSK says they are. And CHKDSK won't tell you if a subdirectory is itself contiguous, a strange omission since subdirectories are files like any other, and may or may not be stored in

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a contiguous space.

In addition to the bugs found in PC-DOS 2.0 there is a serious bit of sabotage. Two of the PC-DOS services were changed in a way that will make some old programs incompatible with the new PC-DOS release. The implications of an incompatibility being built into the new version of an operating system are far reaching. How many programs, now or in the future, might be sabotaged by changes to the way that PC-DOS works?

With the wonderful new use of "paths" in PC-DOS 2.0 you may be a little surprised to discover that the Print command does not handle paths; it will only accept files out of the current directory. Print also suffers from some terrible performance problems. When you use a print spooling program, your computer is doing multi-tasking; it is working on more than one operation, more than one task, at a time. When multi-tasking is going on in a system, there's a question of the priority of the tasks—which one will get first call on the computer's resources? The usual policy for a print spooler is that it should be given a high priority so that the printer can keep going at its maximum speed. Even though the computer's other operations (such as processing commands that are typed in at the keyboard) may be more important, a print spooler program normally uses so little of the computer's thinking power that spoolers are customarily given the highest priority. After the spooler does its small amount of work, the rest of the computing power is returned to other uses. At least that's how a spooler should work normally.

THE PRINT command runs with a very low priority; if your computer is doing anything else, Print barely gets any printing done.

But, in PC-DOS 2.0, the Print command runs with a very low priority; if your computer is doing anything else, Print barely gets any printing done. In some cases, Print hardly works even when the computer is doing nothing else. As if this weren't bad enough, Print also eats up about 11 percent of your PC's horsepower. For an 11 percent "tax" on our computing power, we ought to expect to get a lot of printing work done—but that isn't the case with the 2.0 Print command.

Illogical Limits

Besides the problem of Print command not accepting paths as files, there are other annoying and petty restrictions for PC-DOS commands. Commands should accept path names and generic file names (which use * or ?) whenever they make sense, but in several cases the names were rejected. Also, when a PC-DOS command takes several parameters, you should be able to use commas, spaces, or some other characters freely to separate the values for the parameters. But at least one PC-DOS command, EXE2BIN, won't accept the same parameter format that it used under PC-DOS 1.10. If a PC-DOS command gives you any complaints about using improper parameters or the wrong number of parameters, try another delimiter, or replace commas with spaces or vice-versa.

The Echo Off command is a useful new feature that makes it possible to keep batch files from displaying extraneous information about the commands being carried out. This can be a very helpful tool in setting up friendly batch files. Unfortunately, there are some bugs in the way Echo works. When a batch file ends, Echo gets turned back on, whether you want it or not. And if the last command in the batch file doesn't end with a carriage-return, Echo gets turned on before the last command is performed, a very curious quirk. I've also had reports of even more exotic problems with the Echo feature. The whole point of the Echo feature is to make the operation of the computer slicker and less technical, for the convenience of the person using it. Unfortunately, the bugs in Echo defeat much of its purpose.

The volume ID is another little sore point in PC-DOS 2.0. You can now give a volume label to your disks and fixed disks to help keep track of what's what. A nice idea, but it was carried out very poorly. First, you can place a label on a disk only when you format it—PC-DOS doesn't let you change labels or add labels to a disk that is already formatted. And PC-DOS

won't let you put labels onto disks in eight-sector format, only in the new nine-sector format. I solved the label problem by writing a label program that can add, change, or delete volume labels in any format of disk. (I added the label command to my utilities set.) Unless you have a program like this, PC-DOS gives you very poor control over disk labels.

To make things worse, PC-DOS reports labels in a poor way. Whenever PC-DOS is reporting on a disk while executing commands like Dir, CHKDSK, or Tree, it tells you the volume label of the disk. This is a good idea—in fact, this is what labels are intended for. But if the disk doesn't have a label, PC-DOS doesn't keep quiet—it complains to you, again and again. Sometimes it complains by saying that the disk has no label, other times it says that the disk has a label of ???????????—that's right, a string of 11 question marks! This isn't what I would call slick behavior.

The Forgotten Human Element

In fact, the fiasco of the PC-DOS approach to handling labels points to the biggest problem with DOS 2.0. It isn't one of the bugs in PC-DOS—these are likely to get fixed at some time or other. The problem is inadequate human engineering. The authors' work demonstrates a cavalier attitude toward the concept of user-friendliness. Computers are spreading rapidly in our society, and of course the PC is playing a large part in this. As more and more people start to use computers, it becomes more important that computers be easy to use, easy to understand. But the PC-DOS revision doesn't represent a step forward in making computers humane; it is a step backward. Compared to previous versions, PC-DOS 2.0 is much more technical, more complicated, harder to use, and generally not as kind to its users.

THE BIGGEST problem with DOS 2.0 is inadequate human engineering.

As another example of how 2.0 isn't all we should reasonably expect, consider the Tree command. Tree reports on the structure of directories and subdirectories on a disk. But when Tree formats its output, so many extraneous blank lines are sent to the display that the information provided by Tree rolls off the screen much too quickly. Now I don't want to give anyone the impression that this is an earthshaking matter, but it illustrates the currents that run through almost everything in PC-DOS 2.0; poor human engineering, poor attention to detail, poor regard for the smaller aspects of quality.

What is going to happen with PC-DOS? IBM is always closed-mouth about what it might be working on for the future, so I can only guess. There are two messy problems that IBM faces with PC-DOS 2.0. One is the errors in the new version; the other is IBM's need to continue selling two versions of PC-DOS, since 2.0 can't be used effectively on machines with only 64K.

There are so many problems with 2.0

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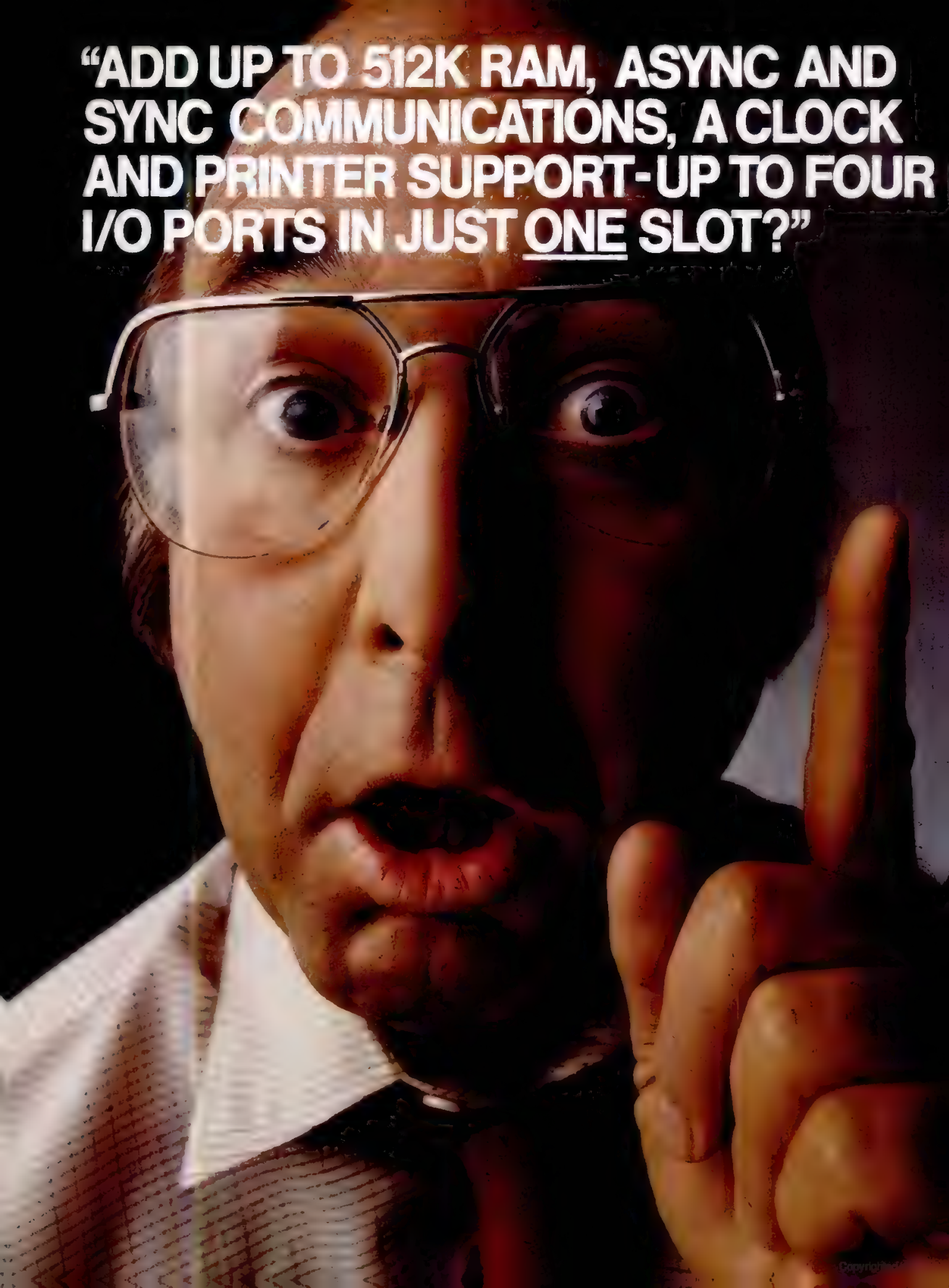


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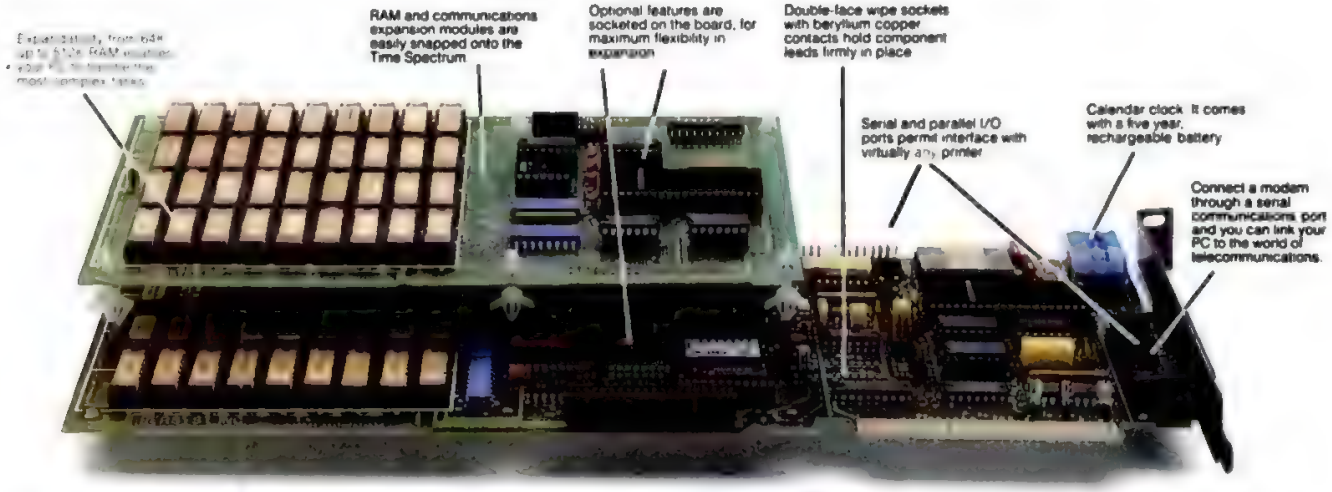
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that I don't think that IBM can sweep them under the rug. I expect that, before long, we'll see an error-fixing release of PC-DOS; perhaps it will be numbered 2.05, like the unoffical and short-lived 1.05 version. The problem of dealing with a pro-

THERE ARE SO many problems with 2.0 that I don't think that IBM can sweep them under the rug.

liferation of versions of DOS—1.10, 2.0, and (I speculate) 2.05—is one that we and IBM will probably just have to bear.

Sins of Omission

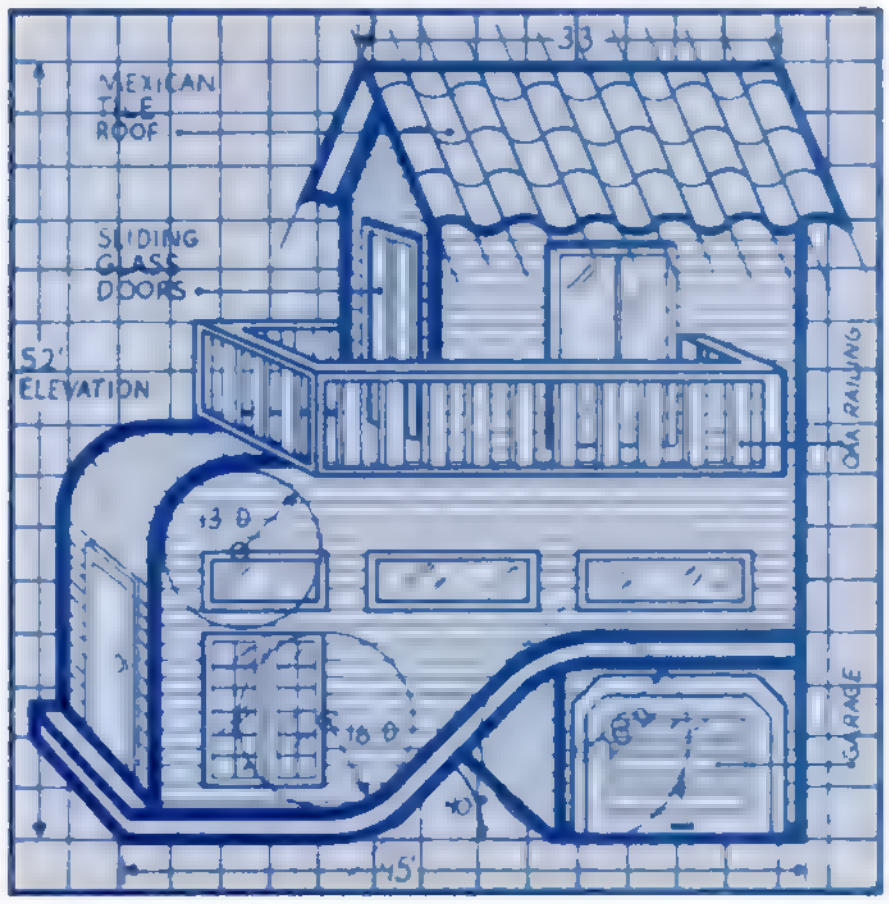
It is worth noting one other problem with PC-DOS—the missing parts. The disk operating system used on the IBM PC is a version of the Microsoft MS-DOS operating system. Unfortunately, IBM hasn't chosen to give us everything that Microsoft makes available. There are parts to MS-DOS that IBM takes out before it passes it on to us. So, even if you are happy with PC-DOS 2.0, you should think about features that IBM could have given us but didn't.

Among them is a Comp command that will try to find matching points in text files, rather than just report ten nonmatching bytes and give up, as the IBM version does. Another feature, worth a lot to serious program developers, is a library maintenance program that works with program object libraries. Other interesting things we didn't get are a Cipher command to encrypt and protect our data, a Profiler to examine and report where a program is spending its time (very useful for making programs efficient), and a Login command to control access to the computer.

You get the picture—there is a lot we could have had, but didn't get. What we did get was a recycled operating system that is full of problems. */PC*

Peter Norton has written Inside the IBM/PC, *published by The Robert J Brady Co., and a set of programs to supplement PC-DOS, called* The Norton Utilities.

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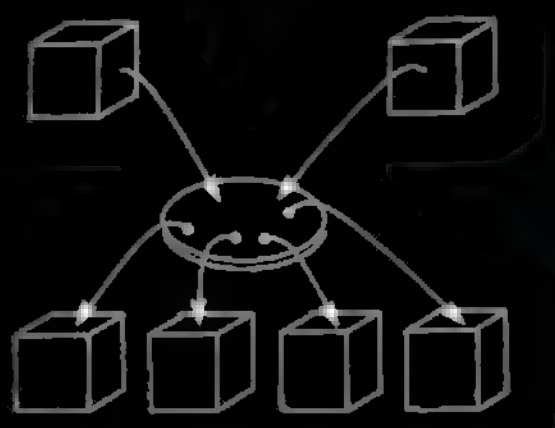
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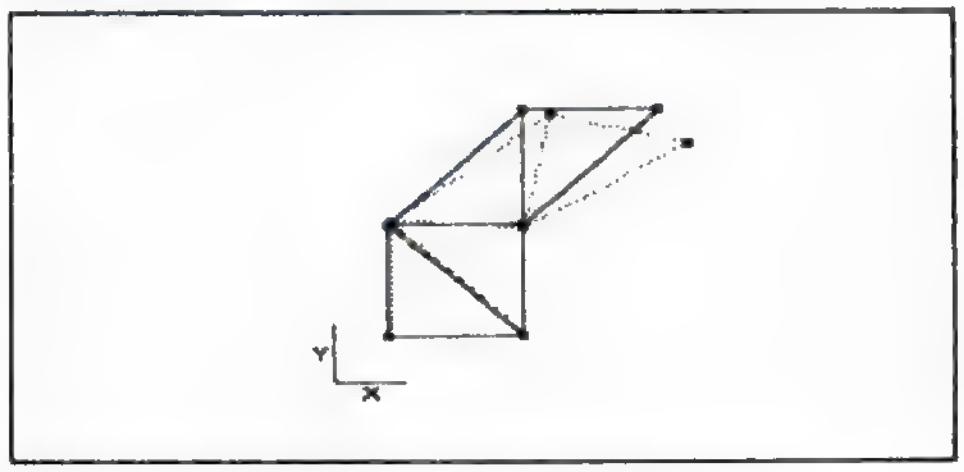
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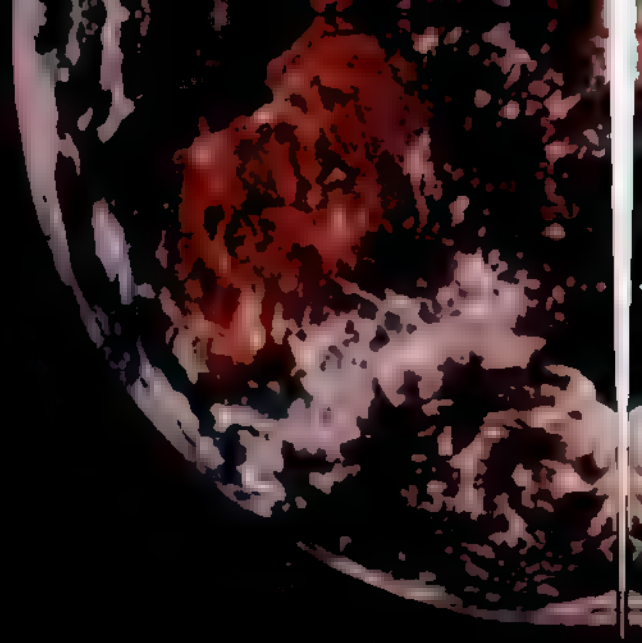
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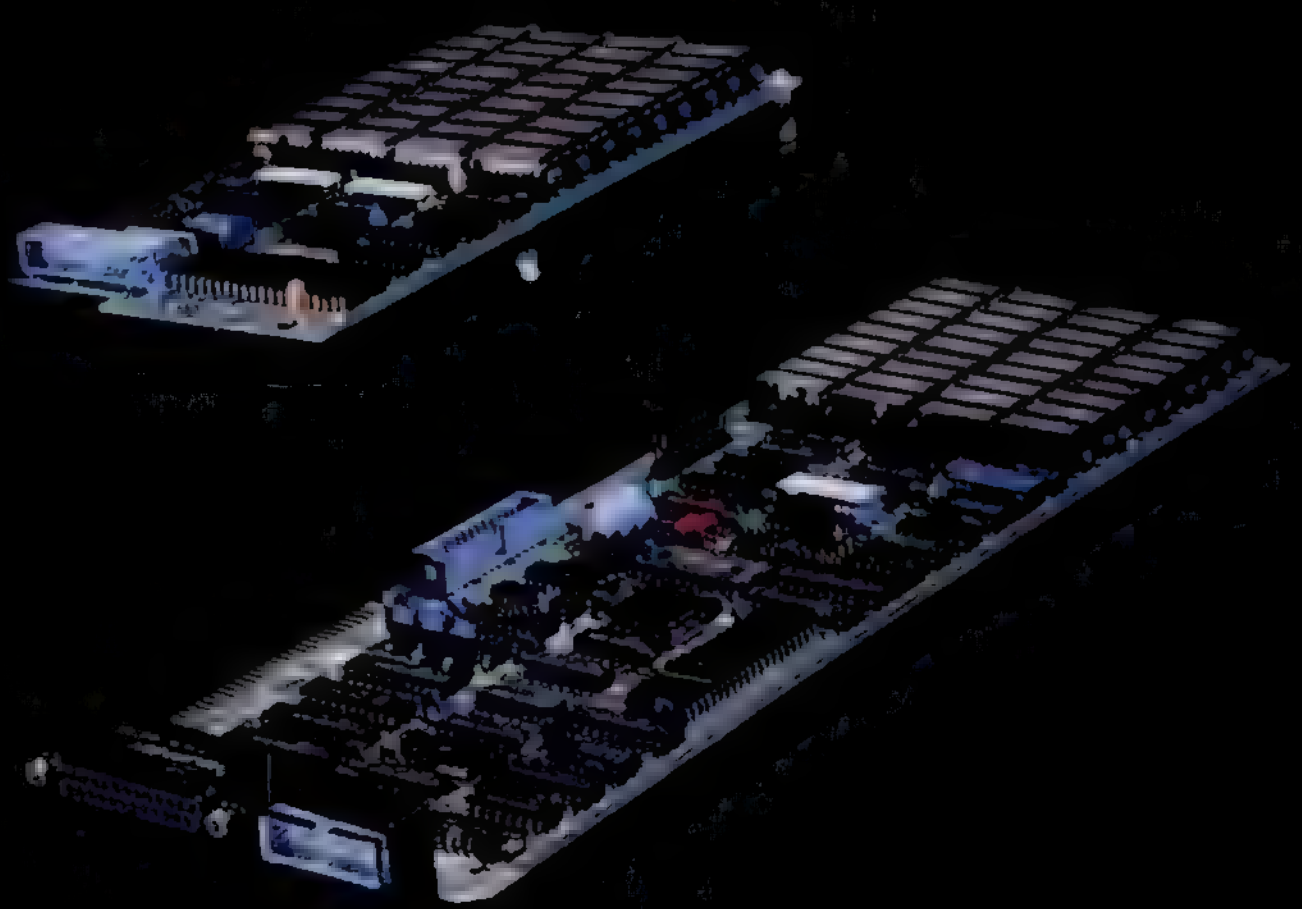
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The world is shrinking into a global village, at least for some of its citizens, just as McLuhan said it would. Doctors, accountants, and sales personnel trot from one side of the country to the other in the course of their daily duties. Sometimes, using personal computers, they can send their urgent information on ahead of them, modem to modem. But what if one wants to massage some data from the desktop PC while in transit, and be able to present it as a printed report to a client on arrival?

The makers of a brand-new portable computer, the 16-bit Gavilan, claim to have a way to solve this problem with the touch of a finger. This battery-powered portable is based on the Intel 8088 microprocessor chip and runs MS-DOS as well as its own proprietary operating system.

The main unit integrates a display, keyboard, CPU, memory, auxiliary memory capsules, and rechargeable battery pack into a single package. Its total weight is only 9 pounds, or 14 pounds with optional printer. The unit measures 2.75 inches high and 11.4 inches wide and long; even with the printer attached, the unit slips easily into an average-sized briefcase.

Gavilan Computer Corporation introduced the unit at COMDEX/Spring in Atlanta, Georgia. The Gavilan system is aimed at the "mobile professional" mar-

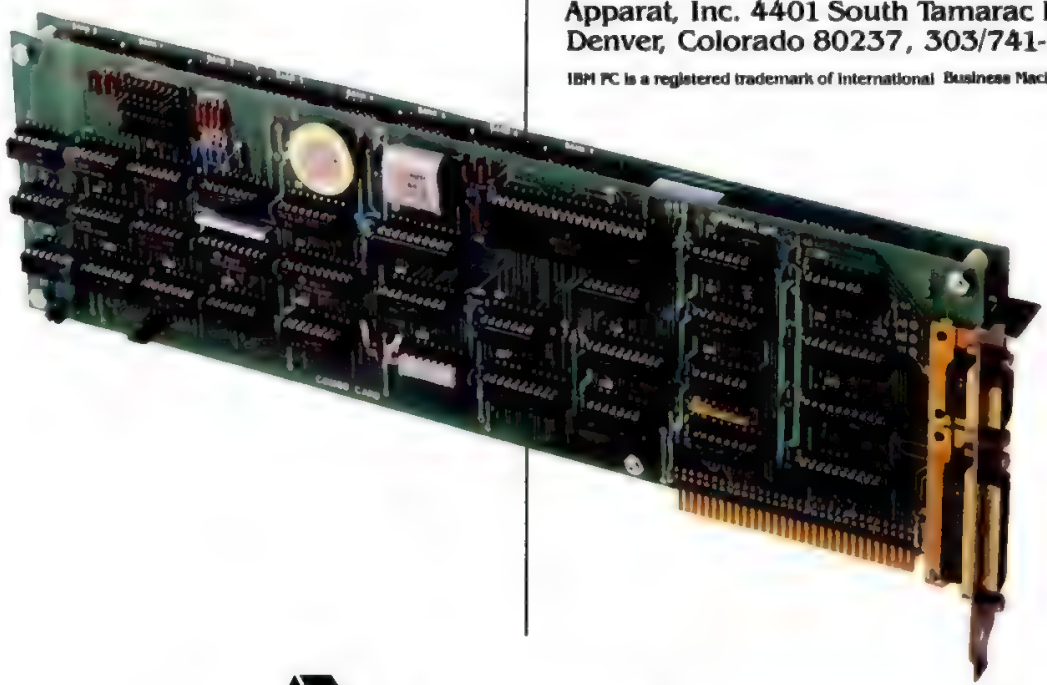
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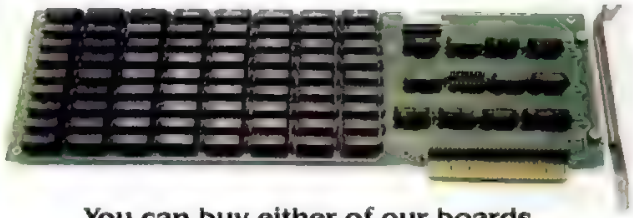
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ket—users who must carry their work with them from desk to desk, or even from city to city. The company offers those users what it calls a "mobile office," a compact environment that supplies all the basic needs of the traveling businessperson and can also accommodate specialized software.

Included in the system are an eight-

EACH MEMORY capsule contains lithium batteries that provide one year of storage backup.

line, 66-character flat liquid crystal display (LCD) screen, a built-in 3-inch 320K microfloppy disk drive, and a unique touch panel that performs all the functions of a standard "mouse."

The portable comes with 80K of internal memory. 48K of that memory is in ROM, which includes the internal user-interface software; the other 32K is available to the user as RAM. Users also receive a 32K RAM capsule, bringing the total up to 64K RAM in the unexpanded unit. Extra plug-in memory capsules can add another 128K.

Bundled software for the Gavilan consists of an industry-standard version of MS-DOS, with BASIC and Pascal, and the manufacturer's proprietary CapsuleWare, which includes the user-interface operating system, a word processor, a spreadsheet program, a "portable secretary," and a communications manager. The latter four are available as self-contained programs in "capsules," containers slightly smaller and thicker than a cigarette pack.

Input and output for the Gavilan are provided through an RS-232 serial interface, a built-in 300-baud modem, a direct phone interconnect, and a system I/O bus. A rechargeable NicCad battery pack will operate the machine for up to 8 hours of continuous use. Also, each memory capsule contains lithium batteries that provide one year of storage backup; a similar battery keeps memory refreshed in the main unit. Use of CMOS circuitry keep the Gavilan's energy consumption low.

The Gavilan costs $3,995; its printer, a full-page thermal dot matrix unit with a sheet paper feeder, costs $985. Other options will be available, including an acoustic coupler/modem, a power adapter that connects to a vehicle's cigarette-lighter, an attachable second disk drive, and memory expansion module. The prices for these peripheral devices remain to be set.

Gavilan's Target

When Manny A. Fernandez, president of Gavilan Computer, and his founding partners first decided to build the system, they began with three simple must-haves: the machine had to be battery-operated, it had to be briefcase-size, and it had to be IBM PC compatible.

Gavilan's founders formed the company in February 1982. Fernandez left his position as president and chief executive officer of Zilog, Inc. to head the new company. Two other founding partners—Wayne Sennett, vice president of sales, and John Banning, Ph.D, vice president of software development—also came from Zilog. Their departure was amicable, noted Fernandez, as evidenced by the fact that Gavilan's offices are nestled in the Zilog building complex in Campbell, California.

It took the trio 4 months to raise their first venture capital. The privately-owned firm has been capitalized by a group of venture-capital investors that includes New Enterprise Associates; Abingworth, Ltd.; Smith Barney Venture Corp.; Associated Venture Investors; Genesis; and Robertson, Colman, Stephens & Woodman. This year Gavilan has established a $17-million line of credit with Bank of the West, a wholly-owned subsidiary of Banque Nationale de Paris.

Fernandez envisions the ideal end-user for the Gavilan system as the person who works in a "multiple-desk environment." Outside the office, desks could be a desk at home, several desks spread through several buildings of one company, a client's desk, or even the tray on the back of an airplane seat.

"Mobile professionals don't want to take a week, a month, learning how to use the computer. Therefore, the machine had to be very easy to learn," said Fernandez. The company sought input from several industries that harbor a large number of such professionals, trying to understand how the machine could best help them perform their daily business. Fernandez quoted research estimates that predicted an untapped market of 16 to 20 million customers, all first-time users, who could benefit from the Gavilan.

To accomplish the twin goals of portability and ease of use, the system embodies several technical and software innovations. Patent applications are pending for technology involved in the touch panel and the proprietary software; Banning and Fernandez, however, wouldn't specify which processes they wanted to protect.

The Fingertip Mouse

The most visible variation on the portable computer theme is the Gavilan's touch panel, located directly above the full-size typewriter keyboard. With this panel, you can manipulate data without typing a single character—the panel acts as a stationary "mouse." Most of your interactions with the system filter through this panel.

As you move your finger on the panel, the cursor moves on the screen. To command the machine to act, you move the cursor to the desired function and tap the screen, signaling the system to go ahead. The panel senses the relative position of your finger, and moves the cursor in the same direction you move your finger, regardless of the finger's initial position on the panel.

AN EXTREMELY clear Help facility will answer queries on the level of "What just happened? Where am I? What do I do next?"

The "human-interface software" for the touch panel makes it particularly easy for the novice user to grasp the fundamentals of using the Gavilan. Banning estimates that a first-time user could work with the unit after only 15 to 30 minutes of instruction.

Data categories are illustrated with

graph symbols on the highly-visual LCD screen; some symbols are mildly humorous, such as the blinking hourglass that indicates the system is still completing an action. The symbols are modeled on everyday office items (such as the file drawer, desktop, and telephone) to clarify their purpose as much as possible. The screen output can also drive a 24-line 80-character video monitor.

An extremely clear Help facility, which can always be accessed without interrupting ongoing computations, phrases its counsel in lucid language. The Help menu's design, Banning said, was inspired by the thought of "What does a person ask when he's sitting down in front of a computer and not understanding things?" As a result, Gavilan will answer queries on the level of "What just happened? Where am I? What do I do next?"

Gavilan had to write its own language, Interpac, to implement this user-interface software. "It's oriented toward being a very compact code, an interpreter, but designed to minimize the overhead that's been traditionally associated with interpreters," said Banning, who led the software team that developed the language. Interpac, derived from FORTH, was designed to take up as little space as possible while still permitting high-quality software engineering.

The language, Banning said, inverts the traditional relationship between the operating system (or the built-in software of the unit) and the applications programs a user plugs into the unit. "What we call the human-interface software calls entry points in the application program for it to do specific things," said Banning. Answers are "context-sensitive"; that is, they refer to what the user is working on at a particular moment, rather than to an absolute definition of a command.

Banning explained, "I use the same call to copy a document from one place to another as I use to copy a paragraph from one document to another. It's all just called the copy operation.

"From the end-user's point of view we've eliminated the idea of a program. He doesn't operate the spreadsheet program—he deals with a document. He can create things in the document that happen to be produced by the different applications plugged in the unit, but the system's switching from one program to another is nothing more than switching from one kind of thing in a document to another."

GAVILAN doesn't plan at this time to sell its system through retail stores.

As a novice user, I offered myself as a guinea pig to examine a prototype model of the unit at Gavilan's headquarters. I found that the touch panel lived up to its advance billing. The pressure of my fingernail or tap of my finger called up a series of instructions on the LCD that were clear and informative without being condescending. I completed instruction sufficient to begin operating the Gavilan in less than 10 minutes.

Working With OEMs

Though the Gavilan's target market is the mobile professional, the system won't be sold directly to those users. Instead, it will be distributed through original equipment manufacturers (OEMs) of hardware, software OEMs, volume end-users, and distributors who will work mainly with multi-unit purchasers.

Any of these manufacturers can integrate the Gavilan products into its own line, perhaps under its own label. Software OEMs are expected to focus on specialized software for vertical markets, such as the insurance industry, and remarket the Gavilan in a total system. Gavilan will also sell to volume end users, usually large corporations that want to give their traveling executives and managers electronic tools.

The company had a choice between servicing end-users directly or developing distributor and OEM support, said Fernandez. Gavilan chose the latter. "Most personal computer companies don't do this," he said. "The whole idea is to bring about an environment in which people

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can write software for our product easily, so the OEM can be able to leverage all of the software to its maximum."

The Gavilan will not be available to individual users; the company doesn't plan at this time to sell its system through retail stores. European sales are supported by the Gavilan office in Geneva, Switzerland; sales to the Asian/Pacific market are managed out of the company headquarters in Campbell.

Fernandez said that Gavilan had "a considerable amount of backlog on the product already"; he would specify only one company—IKOSS, a West German software value-added OEM—as having already placed an order for the product.

How does the Gavilan compare to one of its major competitors, the Grid? Banning said that "Grid is going after quite a different market. Obviously, it's a bit more expensive. Also, you're really tied to the phone line." Banning pointed out that the removable memory storage of the Gavilan is more convenient than the Grid's built-in bubble memory; also, the fact that the Grid is not battery-operated might make it less portable than his company's product.

Gavilan sees its system as an adjunct to the IBM PC, rather than a rival. "Our strategy is to coexist with PCs," said Fernandez. In its MS-DOS environment, he added, the system can run any MS-DOS compatible program; with the right conversion software, he claimed it could toplad or download any program.

"Although it would make a reasonable desktop computer in itself, especially if you plugged in a video monitor and hooked up a second disk drive on the back," said Banning, "it can also be looked at as a very nice adjunct to a home- or office-based computer. This is what you take with you when you're not in the office. If you have a PC in your office," he continued, "that runs *SuperCalc* and *SuperWriter*, for instance, the most effective way to use the Gavilan is to run those application programs on it as well and then transfer the files back to the office computer when you've finished."

The Gavilan was intended to be compatible with the PC, but this portable with a facile user-interface might be powerful enough to be all that some professions will need. Fernandez offered these PC users a message: "It doesn't take $10,000 to have a Lisa or an IBM PC with *VisiOn* on your desk—it takes $3,995." */PC*

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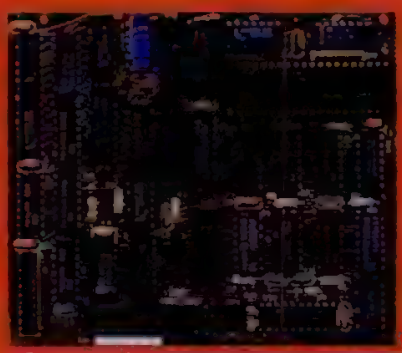
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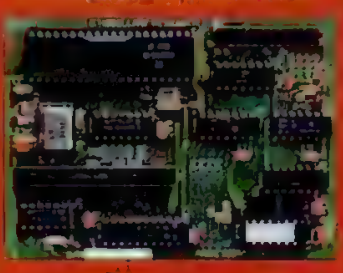
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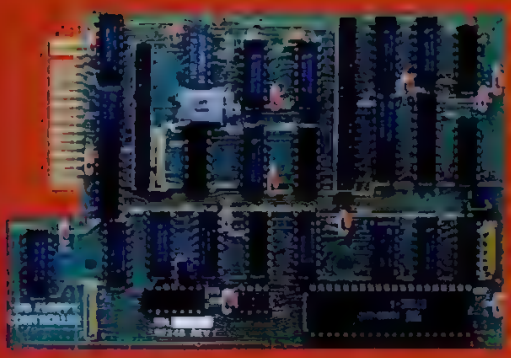
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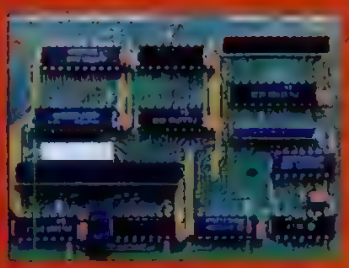
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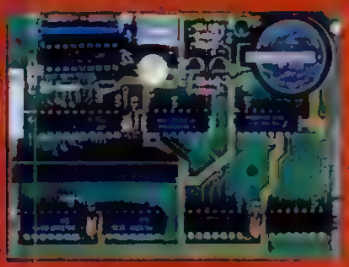
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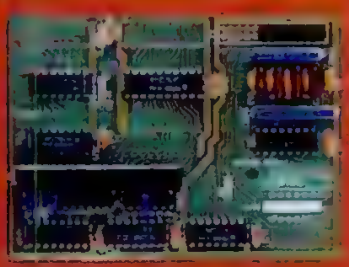
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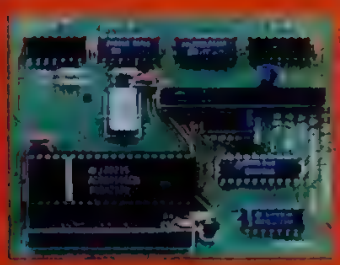
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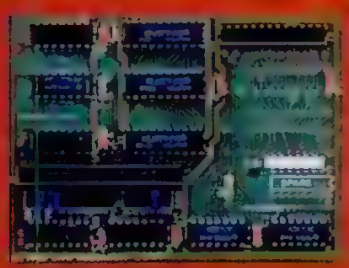
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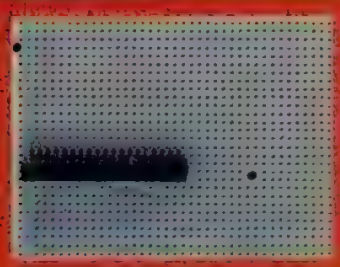
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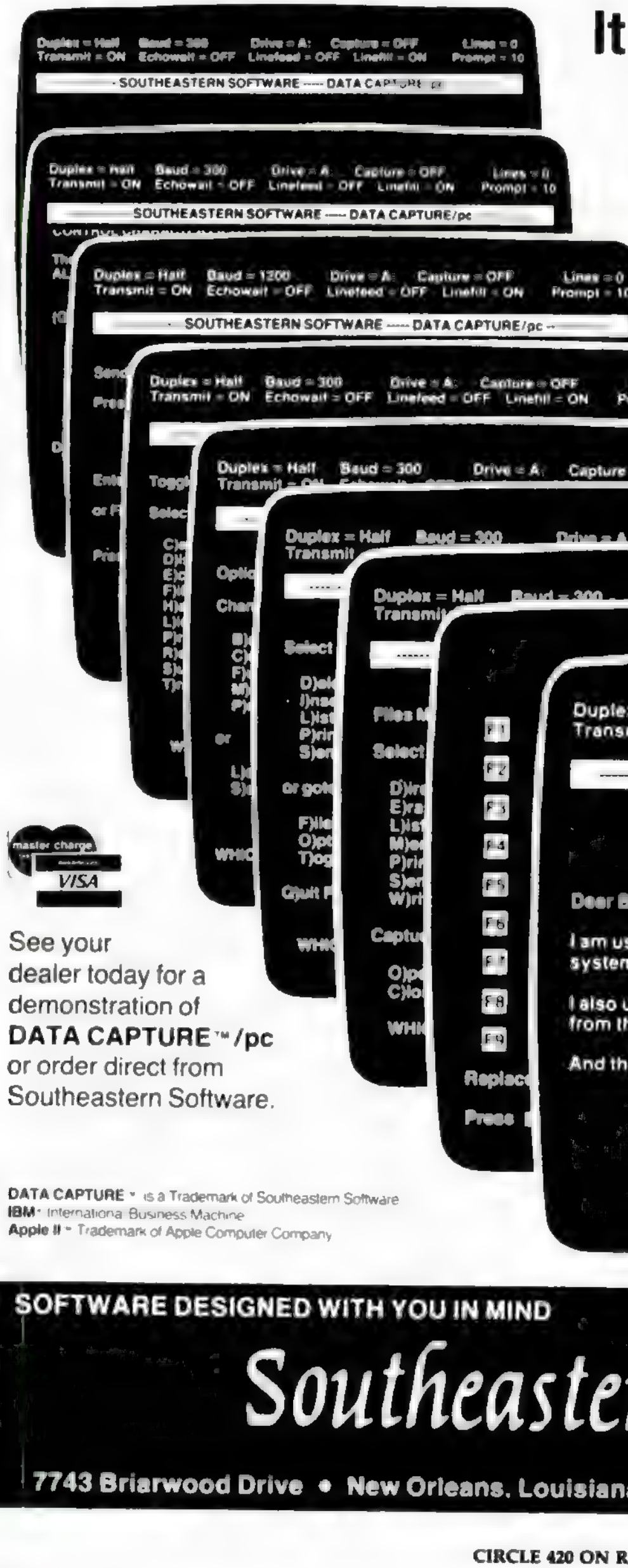
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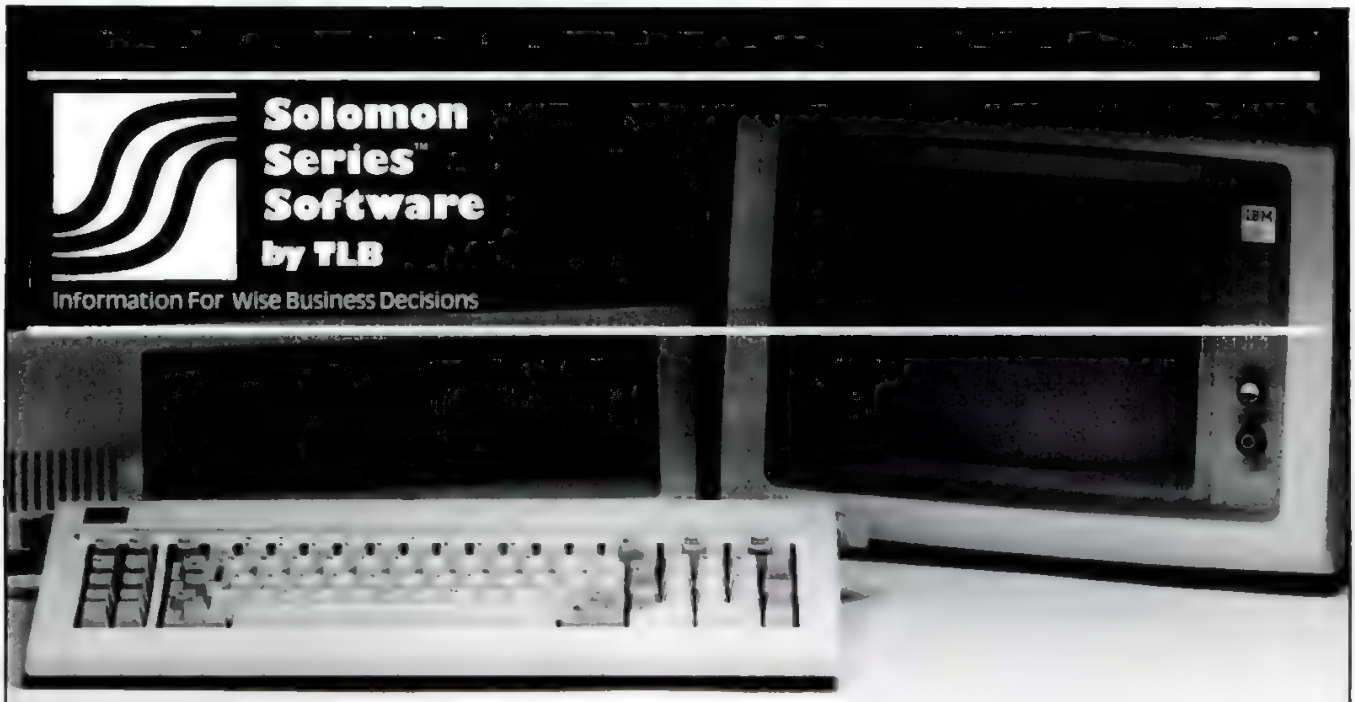
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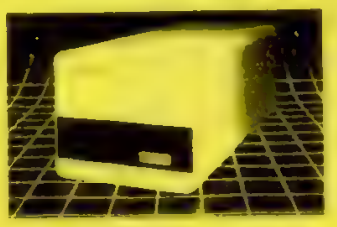
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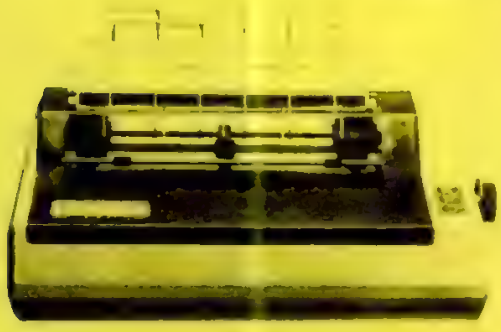
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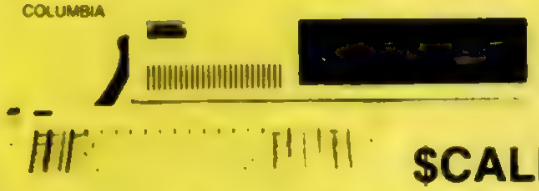
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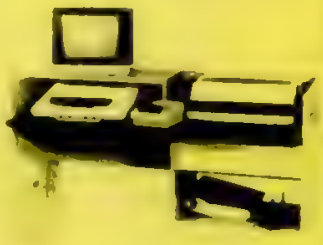
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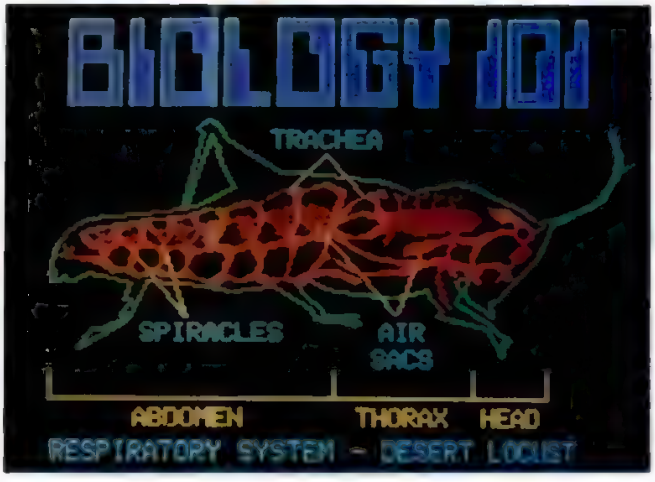
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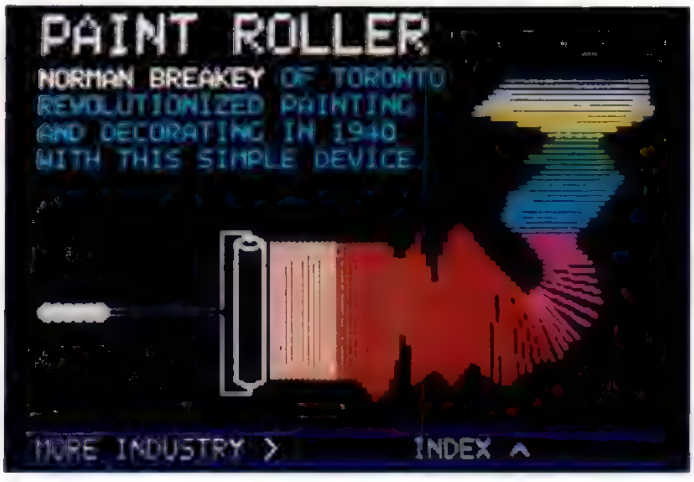
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The Canadians have devised a system to create, transmit, receive, and store computer graphics by adapting ASCII. With the right software this capability is available for the PC.

EXPORTING GRAPHICS WITH NAPLPS





Examples of Telidon-generated color graphics.

Databases are everywhere. The Source and Compuserve are the best known, but there are dozens of others, offering services ranging from news and stock market prices to computer dating. You can connect any computer or terminal in the country to these databases over ordinary phone lines.

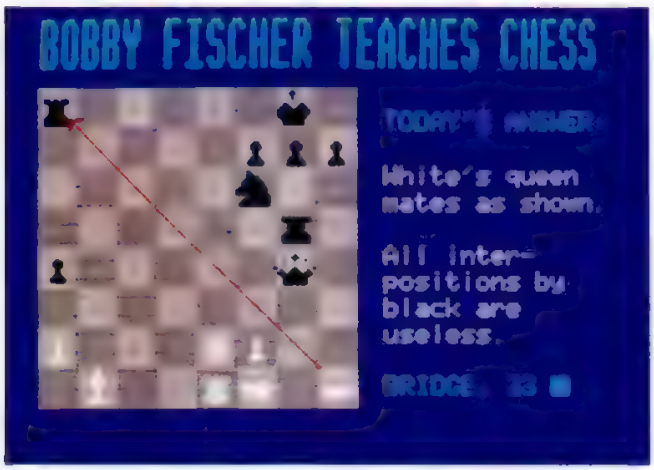
Without ASCII, the American Standard Code for Information Interchange, none of these computers could understand each other. ASCII assigns a 7-bit code to each number and letter and to a set of standard controls, allowing everyone to use the same codes. Under ASCII, everyone agrees to encode the letter *A* as 1000001 and the carriage return as 0001101, allowing you to send messages from your PC to the Source, or receive messages on your PC from your friend's Apple.

But how do you encode a picture of a red house with a yellow roof? How do you encode a bar chart showing last year's profits? How do you send a picture to another computer in a way that the other computer will understand? Is there an ASCII for graphics communication?

Hallelujah, the answer is yes! A powerful new graphics communications system imported from Canada can now help you perform the functions mentioned above. Although it hasn't yet gained the universal acceptance extended to ASCII, it is backed by AT&T, CBS, and Time Inc. Further, it hasn't any serious rivals, and in an industry hungry for standards it satisfies a real need. It's called the North American Presentation Level Protocol Syntax—NAPLPS—pronounced "nap-lips" by the irreverent. NAPLPS makes graphic information portable, just as ASCII does for text. It also makes graphic data banks possible, creating a new realm of computer use for the average citizen.

Instruction Codes

The NAPLPS encoding scheme is based on alphageometric descriptions of graphic images. Using a set of five primitive graphic elements—point, line, rectangle, arc, and polygon—and following





instructions for text, colors, fill patterns, and outlines, NAPLPS constructs a description of an image: "Go to the middle of the screen. Set the color to red. Create a filled rectangle, 2 inches to the side. Go up 2 inches. Set the color to yellow. Begin defining a polygon. Go up 1 inch and to the right 1 inch. Define this as the second point in the polygon. Go down 1 inch and to the right 1 inch. Define this as the third and final point in the polygon." These instructions generate the image of a little red house with a yellow roof.

Each of the instructions in the example is called a "picture description instruction," or PDI. Like ASCII, each instruction is written in a 7-bit code. The 7-bit code for "set color," for example, is 0111100, and the code for red is 1010010. These strings of bits also have meaning in the ASCII coding scheme. The set color code, for example, also stands for the "less than" symbol (<) in ASCII. To avoid the possibility of confusing the intent of the code, NAPLPS uses a special code to "shift in" and "shift out" of the graphics mode. When in graphics mode, 0111100 means set color, while out of graphics mode it means "less than". Thus, a picture encoded in NAPLPS can also include text, and the text codes are the standard ASCII codes.

The string of PDIs for the little red house consists of about 30 7-bit characters and can be used in the same way as an ASCII string. You may transmit it to another computer; store it in a database; and index it, locate it, or manipulate it with the facilities of the database. To reconvert the string into a picture, you need a combination of hardware and software that can interpret the string as PDIs, and display it on a color screen.

NAPLPS MAKES graphic information portable, just as ASCII does for text.

The NAPLPS PDI standard is very powerful. It's completely resolution-independent, allowing the same PDI string to be decoded and displayed on a 600 pixel by 600 pixel color graphics monitor, on a standard TV set, or even, in a rudimentary form, on an 80-character by 24-line character terminal. Because NAPLPS relies on standard 7-bit units, any hardware that can handle ASCII characters—ordinary modems and phone lines, TV cables, and local networks—can handle NAPLPS pictures. (The NAPLPS PDI scheme is also available in an 8-bit version, which is even more powerful.) Since the picture consists of meaningful constituent parts, picture elements (often called "objects") that are frequently used can be stored on a disk and incorporated in any other picture. The geometric nature of the description allows the computer to scale, rotate, and reflect images. If you were creating a long document, for example, you could save the corporate logo as an object, then place it anywhere in any new picture in whatever size you desired.



Figure 1: Example of "dynamically-redefinable character sets" (DRCS), in this case, Arabic letters, generated with Teligraph.

Videotex

NAPLPS is descended from the Canadian videotex system called Telidon. Videotex, in the broadest sense, refers to any publicly-accessible computer database; the Source sometimes refers to itself as a videotex service. Most discussions of videotex use a somewhat narrower definition: menu-driven, user-friendly database (and interactive transactional) services aimed at a broad home market and that make heavy use of graphic information. This definition stems from the theory that the average person will not use computer databases unless they communicate—at least in part—with pictures. In order to use pictures in a database, however, they must be codable and decodable.

Soon, hardware decoders that use television screens as displays will probably be available to home videotex subscribers for $300 or less. A hardware decoder, which includes a modem or other communications device, a microprocessor, and ROM software, interprets the incoming signals and drives the display. It also includes a

keypad resembling a pocket calculator that is used to choose items from menus. The keypad actually sends signals back to the host computer, telling it which pages to transmit. (Hardware decoders for NAPLPS or Telidon are not yet available for $300. Decoders that can be attached to your TV set cost about $1,000, and decoders that include their own high-resolution color monitors cost about $2,500.) Home terminals are connected to host computers using telephone or TV cable networks.

The videotex host computer's database consists of "pages," "frames," or "screenloads" of information. Each page is a static picture that fills the screen and each is numbered. For example, if you know that Montgomery Ward's shoe department inventory is displayed on page 3226, you can key "3226" on your keypad, commanding the decoder to send this information back to the host computer. Page 3226 will then be decoded and displayed on your screen. Since you are not expected to remember all the page numbers, many pages are contained in the menus. For example, given a choice of 1-News, 2-Sports, and 3-Shopping, keying 3 will provide another menu page offering further choices, such as Clothing, Housewares, and Cosmetics. Hunting through the menus, you will eventually reach the shoe page.

The essential features of this system are page-by-page encoding of information, a tree-structured menu-driven system, and interactivity between the host computer and the decoder.

THE VIDEOTEX host computer's database consists of "pages," "frames," or "screenloads" of information.

In existing Telidon/NAPLPS videotex databases, pages are created on an Information Provider System (IPS). An IPS is a $15,000 microcomputer-based machine with two disk drives, a graphics tablet, a color screen to show you what you've created, a black-and-white screen to present instructions and menus, and a keyboard to enter instructions and text. With an IPS, you can create the simple little house in about 4 seconds. Two keys tell the IPS that the color should be red, and another two tell it to "create a rectangle." When the artist touches two points on the graphics tablet, and a red rectangle appears on the color screen instantly. The two points become opposite corners of the rectangle. Four more keys set the color to yellow and tell the IPS to "create a polygon." The artist then touches the three points corresponding to the three corners of the roof and it appears instantly. A much more complicated polygon can be created just as easily by touching each corner. Using an IPS, you can create a high quality color image as fast as you could sketch it with pencil and paper.

After the pages are created on the IPS

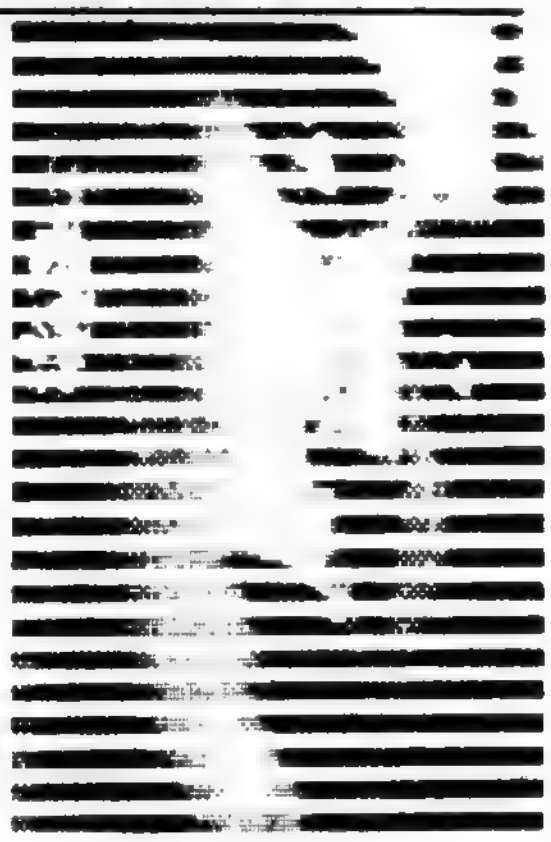
Figure 2: Hardware decoder in Canadian shopping center.



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(the strings of PDIs describing the pages are defined and stored on the IPS disks), they can be transmitted to a mainframe computer or carried there on disks. At the mainframe, they can be integrated into a videotex database. All the numbering, indexing, and linking of "Shopping" to "Clothing" to "Shoes" pages takes place at this stage.

NAPLPS images can also be used to create a slide show. A set of NAPLPS pages can be created on an IPS, then loaded into the RAM of an Electronic Projector System (EPS). The EPS is connected to a picture decoder and can be run in the same way as a random-access slide projector (punching "877" on the keypad causes the PDIs for page number 877 to be transmitted from the RAM of the EPS to the decoder), or it can be programmed to cycle through the pictures automatically, allowing you to vary the interval between them. An EPS costs approximately $2,500.

PC Software Applications

What has all this got to do with your PC? In a word: everything. Although NAPLPS functions are typically performed by machines costing thousands of dollars, none of them is beyond the capacity of your PC.

Decoding a page? If you can get the PDIs for the page into your PC through its RS-232 port, then PC software could interpret it and drive the graphics board and the color monitor. (Decoding is even within the capacity of machines as small as a Timex Z81, if you're prepared to wait for the decoding to be completed.)

ALTHOUGH NAPLPS functions are typically performed by machines costing thousands of dollars, none of them is beyond the capacity of your PC.

Database management? Once the PDIs are on your PC disks, they can be moved,

Telidon and NAPLPS: Canadian Success Stories

Both the Telidon standard and its offspring, NAPLPS, have caused quite a stir on the European computer front—and they are making inroads south of the border.

NAPLPS is the son of Telidon, and Telidon is a child of the Canadian government's Department of Communications.

The Telidon standard was proposed in 1978 by a scientific research team headed by Dr. H.G. Bown at the Department of Communications. Dr. Bown's team observed that several European countries were beginning to develop videotex standards (standards for home-delivered computer graphics) based on an alphamosaic graphic encoding scheme, in which a picture is divided into a fixed number of gridcells, each cell containing one of a fixed set of small "mosaic" shapes. The greatest advantage of the alphamosaic encoding scheme is that it can be decoded by a very inexpensive unit. Unfortunately, it produces unattractive graphics, and is very hardware-dependent since higher-resolution screens cannot produce better images than lower-resolution ones. Compounding the problem, alphamosaic encoding is quite memory-intensive.

The Canadian team reasoned that the greatest appeal of the alphamosaic scheme—the simplicity of its decoders—would diminish dramatically as the price of electronic circuitry decreased. In a paper published in Ottawa in December 1978, the team proposed an "alpha-geometric" encoding scheme in which each of the five primitive graphic elements (point, line, rectangle, arc, and polygon) is used to construct the description of an image. The scheme was the basis for NAPLPS, proposed by AT&T in the U.S. in May 1981.

The battle between Canada's alphageometric standard and the European alphamosaic scheme continues, not because anyone argues that alphamosaic is superior, but because it has more of a track record in home applications and because it's still somewhat less expensive.

Government Support

Meanwhile, the Canadian government has given considerable support to Telidon and now NAPLPS. The reason is financial. Since Canadian manufacturers and developers have been producing software and hardware for Telidon for several years, they have a headstart if a Telidon-based system gains wide acceptance. The software and most of the hardware described in "Exporting Graphics With NAPLPS" is designed and manufactured in Canada.

Because the Canadian government is promoting Telidon- and NAPLPS-based hardware and software, Canadians are more familiar with videotex than Americans are. In several Canadian cities, hardware decoders can be seen in shopping centers and other public places (see Figure 2), giving citizens access to a variety of databases. The Grassroots database in Manitoba contains hundreds of pages that are of interest to farmers, and is installed as a demonstration project in several hundred homes. The Teleguide database, sponsored by the Ontario government, provides information on tourist sites in and around Toronto and Ottawa from terminals located throughout those cities. In addition, Telidon graphics have appeared on the community information channels provided by many cable TV networks in the country.

Videotex in the U.S.

Telidon/NAPLPS-based experimental systems are being used in a number of U.S. cities as well. In cooperation with Canada's Infomart Limited, the Times-Mirror Group of Los Angeles operates the most comprehensive U.S. videotex project, providing information to 350 homes in Los Angeles and Orange counties. The CBS Teletext service, due to start broadcasting soon, will also use the Telidon/NAPLPS standard for its graphics. Through Teletext, a one-way version of videotex, pages of information are broadcast along with normal TV pictures and decoded by special home equipment. —J.H.

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retrieved, and transmitted in the same way as any string of ASCII characters. PCs equipped with the proper modems and communications ports can act as hosts for PC bulletin board systems, and as hosts for NAPLPS graphics databases. Creating pages? Although this is the most complex task, it too is within the scope of a PC. Compared to these functions, producing slide shows is a minor affair.

Three software programs developed in Canada demonstrate that it's possible to perform all of these functions using a PC. Among them, they can accomplish all of the applications I've discussed so far.

Microtaure, a company based in Ottawa, has produced a powerful and sophisticated program called *TeliGraph*, which is used for creating and decoding NAPLPS pages. *TeliGraph* lists for $400 and can be used to create graphic pages on your PC and transmit them to a remote database or to another computer, or to store them on your PC for later use. You can also retrieve pages of NAPLPS graphics from other computers and display them on your PC. *TeliGraph* requires a color monitor, but it costs much less than a hardware decoder would if you already have a PC. (Microtaure promises to release a stripped-down, one-screen monochrome version soon, based on Hercules Computer Technology's monochrome graphics card.)

PCs EQUIPPED with the proper modems and communications ports can act as hosts for NAPLPS graphics databases.

Color is one of the weaknesses of any PC-based NAPLPS system. In NAPLPS, colors are encoded as relative amounts of red, green, and blue, and can be encoded to any degree of precision required, making the possible range of colors theoretically infinite. The standard PC color graphics board, on the other hand, can only deal with four colors. *TeliGraph* must map the colors encoded with the picture onto one of these four color choices. This may pose a problem. A simple outline drawing will survive the mapping intact, but a complicated weather map, in which several colors are significant, may lose much of its meaning when translated into just four colors.

Since many existing NAPLPS or Telidon databases assume the decoder will handle at least 16 colors (hardware decoders are able to do this), problems can arise.

Product	Company	Hardware Requirements	Page Creation	Database Management	Decoding
TeliGraph	Microtaure, Inc. P.O. Box 6039 Station J Ottawa, Ontario K2A 1T1 Canada (613) 745-6661 *List Price: $400*	256K, one disk drive, monochrome and color monitors, driver cards	Yes	Rudimentary	Yes; displays images on color monitor (monochrome will not require two displays)
Tayson Software	Tayson Information Technology, Inc. P.O. Box 30104 Station B Calgary, Alberta T2M 4N7 Canada (403) 230-5998 *List Price: $2,500 range*	64K, two disk drives, one or two asynchronous ports, decoder, two modems	Yes (but mostly a page editing facility)	Yes; can host for multiple terminals	No (separate decoder required)
MVI	MICROSTAR Software Limited 687 Mansfield Ave. Ottawa, Ontario K2A 2T5 Canada (613) 722-7426 *List Price: $280*	128K, one disk drive, color adapter card and color or monochrome monitor, serial (RS232/-asynchronous) port, modem	No	No	Yes; displays images on color or black-and-white monitor (not IBM monochrome monitor)

Fortunately, *TeliGraph* supports the Colorplus board, developed for the PC by Frederick Electronics. This board fits into any PC expansion slot and provides 16 colors instead of the PC's usual four. (The Colorplus board will add about $475 to the cost of a NAPLPS installation.)

TeliGraph also allows a picture to be dumped to a dot-matrix printer. Epson printers such as Graftrax and a number of other models are supported. Colors are interpreted as shades of gray. Although NAPLPS pages won't be reproduced in all their glory on a dot-matrix printer, printer dumps are a very useful feature, especially in business applications.

Using TeliGraph

Creating pages of information using *TeliGraph* is surprisingly similar to using the $15,000 IPS systems described earlier. Menus of instructions are displayed on the monochrome screen. A crosshairs-type cursor on the color display is controlled using the PC cursor control keys or a joystick. The standard right-left-up-down cursor keys move the cursor in the appropriate directions, and the other four numeric keys (1, 3, 7 and 9) move it diagonally. The Scroll Lock key toggles between fast and slow cursor movement.

To draw a picture you move the cursor to a starting point, define the type of graphic image you wish to create, and move the cursor to other points. The PC function keys (F1 to F10) are used to define the graphic image. For example, in order to build the little house, the cursor must be moved to the center of the screen. Pressing F1 tells the system where to begin drawing the picture. Moving the cursor to the diagonally-opposite corner of the rectangle and pressing F3 tells the system that this is the opposite corner of the rectangle. A rectangle would then appear on the color display screen. The yellow triangle would be constructed in a similar way: F4 would be used to initiate the polygon, and the plus key (+) would be used to add more points to it.

Colors are set by using the menus on the monochrome monitor. Text is added to a picture by using F7 to toggle into text mode, then keying in the text. The starting position of the text is defined by the cursor. Text strings can run up or down, from right to left, or from left to right. Letters can be oriented in any of four directions and can be produced in any of 512 different sizes (counting horizontal and vertical scales), although some of the very tall and thin or short and wide sizes are of very limited usefulness.

When overlapping NAPLPS images are specified, the image specified last appears in front. (This feature can be used to simulate animation, with overlapping pictures replacing one another.)

TeliGraph also allows you to create "shapes," sets of PDIs that can be used together and then reused in different contexts. For example, a corporate logo or a map of the country could be saved and

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incorporated into future pages. The software doesn't include scaling or rotation, however. If you need logos in three different sizes, you must store a separate copy for each one.

The software also provides for what NAPLPS calls "dynamically-redefinable character sets" (DRCS). If you don't want to use the standard typeface for letters and numbers or if you need a Japanese or Arabic character set (see Figure 1), you can draw each character using a series of cursor movements and save an entire character set that will then be assigned to various keys. When you shift into this character set, the A key will produce the A in your new typeface, or it will produce the Japanese or Arabic (or other) character assigned to it.

When you're satisfied with the page you've drawn, *TeliGraph* stores the PDI string as a standard PC-DOS file, one page per file. A file can be sent to another computer in the same way as any other file, by using a modem, a serial port, and communications software.

If you have a 300- or 1200-baud Hayes Smartmodem, you can also use the communications module that is supplied with *TeliGraph*. This module allows you to retrieve pages and display them while online and cycle through databases interactively, in the same way as videotext systems. You can also store pages on your disks for later use and transmit pages that you have created.

TeliGraph also has a slide show feature for cycling through sets of pages. Pages can be created using *TeliGraph*, or they can be retrieved from a remote database.

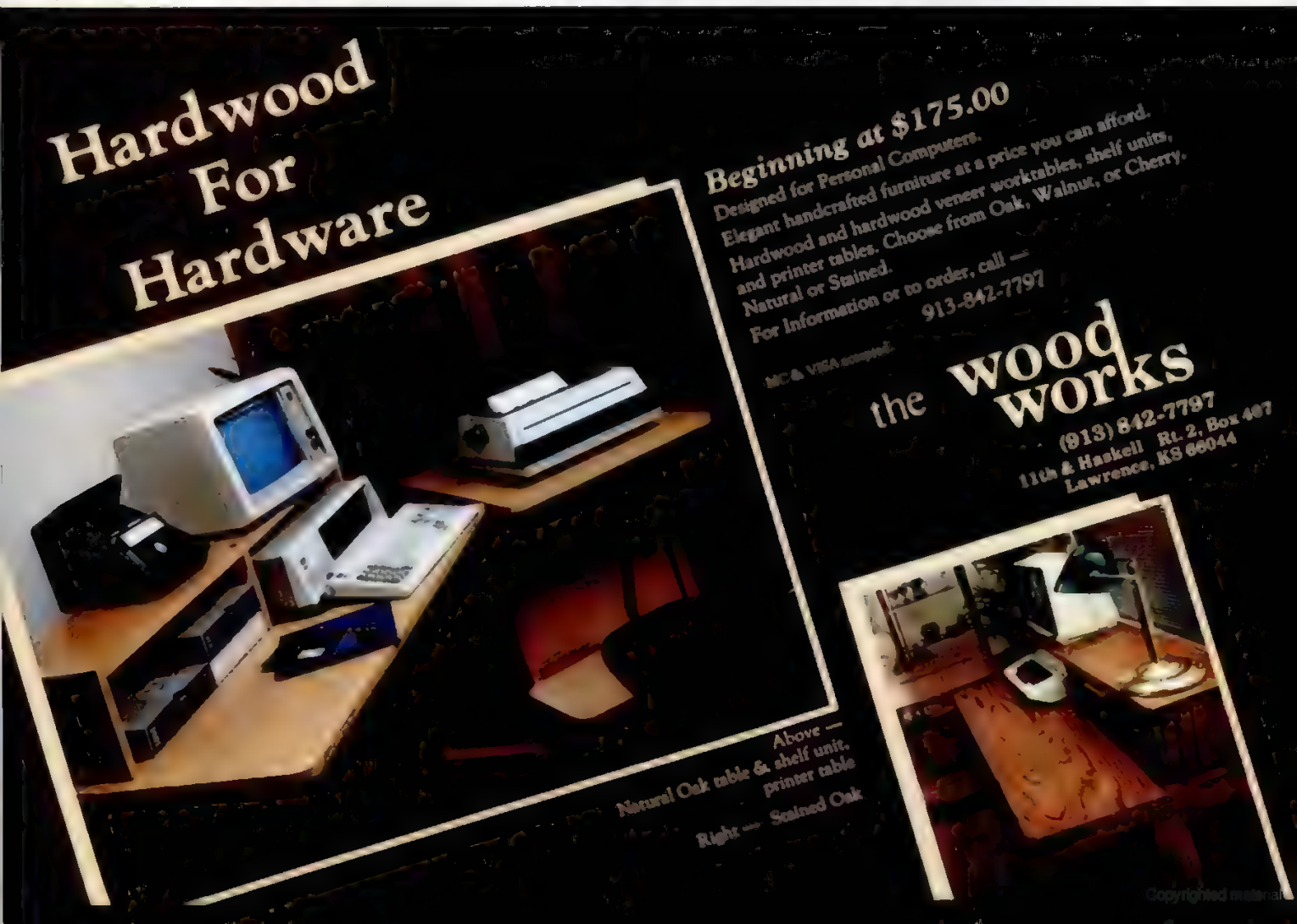
Using *TeliGraph*, your PC can do most of the things that a $15,000 page creation machine can, perform nearly the same functions as a $2,500 hardware decoder, and mimic a $2,500 EPS. Its most severe limitation is imposed by PC hardware,

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which restricts display to four colors.

Tayson Software

TeliGraph won't act as a host NAPLPS database. To turn your PC into an unattended NAPLPS database, you need host software, currently available only from Tayson Information Technology of Calgary and Toronto. Tayson considers itself a consulting firm rather than a retail software company. Consequently, its host systems are expensive ($2,500 or more), though well-supported.

The software includes a page creation and editing feature, but it's not nearly as sophisticated as *TeliGraph*. For example, it doesn't allow you to create libraries of reusable objects, and its cursor movement isn't as simple. You can edit a page by changing a string of text or a color, but you must know quite a bit about PDI codes in order to make full use of this function. Tayson seems to believe that pages will be created using traditional IPS systems (or software like *TeliGraph*), then transferred to systems equipped with its software.

Tayson's strong point is database handling. Sets of PDIs are stored as fixed-length records, one page per record, in random access PC-DOS BASIC files. (The software is written in BASIC and compiled; you buy object code, rather than source code.)

A typical NAPLPS or Telidon database allows you to specify which page you want to see next by choosing a number from a menu, often in the 0 to 9 range, and then keying in your choice from a numeric keypad. It also includes keys with the less than (<), greater than (>), and carat (^) symbols. Tayson's database software allows you to specify which page in the file is represented by each user input. For example, an input of < could represent page 321; > could represent page 323; ^ could represent page 312; and 0 could represent page 1. The characters 1 through 9 can also be used to define pages. Although this is an extremely flexible database structure—it's not strictly a hierarchical tree—you must exercise caution when you design an index. If a given page is not listed in the index, you may become trapped in a "black hole."

Tayson's software currently allows two people to use a single PC simultaneously (if it is equipped with two RS232 ports and modems), and upgrades for up to 8 users will soon be available. The current version requires 64K minimum memory, but Tayson recommends 128K. (128K is required for page editing; the 8-user version will require considerably more.)

Tayson's software assumes that you have a hardware decoder (or another computer equipped with decoding software) attached to the PC serial port. A decoder is necessary if you wish to use the page editing features or if you wish to retrieve pages from a Tayson database. If you are using a Tayson database, however, your PC cannot run *TeliGraph* or other decoding software at the same time.

MVI

The final piece of Canadian NAPLPS software for the PC is produced by Microstar Software Limited of Ottawa. Known as the *Microstar Videotex Interpreter*, or *MVI*, it is written in compiled BASIC and Assembler. *MVI* is simply a decoding and communications program; it has no page creation or data management features and it isn't even equipped to save pages that it retrieves while online to a database. On the other hand, it requires only 128K, a single color graphics board connected to any color display or to an inexpensive monochrome display, and any modem. In addition, the software costs a mere $280. You can't get into NAPLPS for less.

TELIGRAPH also allows you to create "shapes," sets of PDIs that can be used together and can be reused in different contexts.

Before you decide to purchase *MVI*, you should be aware that it doesn't support the full NAPLPS standard. Since it works with the older Telidon standard, it cannot use the dynamically-redefined character sets created with *TeliGraph*. This isn't such a big disadvantage, since most of the NAPLPS databases don't use the full standard either. *MVI* works with these databases better than a full NAPLPS

package such as *TeliGraph* does, and Microstar promises to release a full NAPLPS package soon. (Meanwhile, Microtaure offers a stripped-down version of *TeliGraph* that works with databases better than its full package does.)

When you load *MVI* into your PC, you are given a choice of communications options, as well as a choice of either standard dumb terminal mode or "Telidon" (NAPLPS) mode. You can then dial the remote database and exchange account information with it as required. Once you are in communication with the database, you can retrieve pages of information according to the database prompts. *MVI* will decode the pages and display them on your color screen. Although the standard IBM color board limits your choice of colors to four, *MVI* can be used with the Colorplus board and will soon be compatible with the board's 16-color capacity.

Microstar also offers software developed by Indigo Data Systems for dumping your decoded pages to a printer. $45 will buy a program that can be used with an IBM dot matrix printer; $50 will get you color if you have the IDS Prism color dot matrix printer. (The printer itself ranges in cost from $1,299 to $1,499.)

THERE ARE enhancements on the way for the NAPLPS standard, including ways to encode sound as well as graphics.

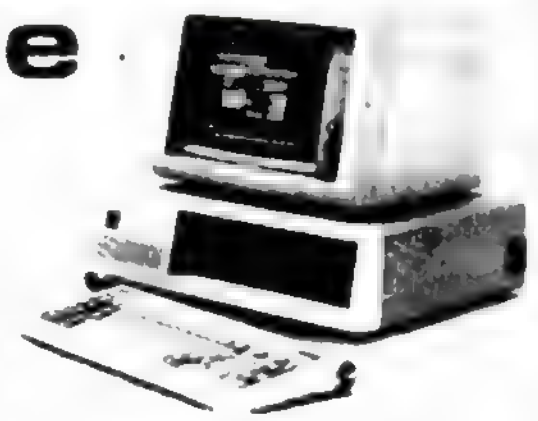
Microstar has also developed a monochrome version of its software that can be used with two different PC portable imitators, the Dynalogic Hyperion and the Compaq. Both of these computers have excellent, high-resolution monochrome screens, which do a creditable job of displaying NAPLPS pages.

Future Developments

There are enhancements on the way for the NAPLPS standard, including ways to encode sound as well as graphics, ways to encode near-photographic quality images, and "Picture Manipulation Instructions" that will allow you to perform special functions such as zooming in on parts of pictures. There's even more software on the way that will be able to create pictures. Since a graphics software producer can encode images using NAPLPS, there's no reason why you can't create NAPLPS images using a program rather than a page creation system. Microtaure is working on such a system now, and claims it will replace LOGO.

Canadian software is leading the way toward universal acceptance of NAPLPS. NAPLPS-based systems have been available to Canadians for several years, and experimental systems are now being used in a number of U.S. cities. NAPLPS promises to enhance graphics communications between computers, and ultimately, between nations as well. */PC*

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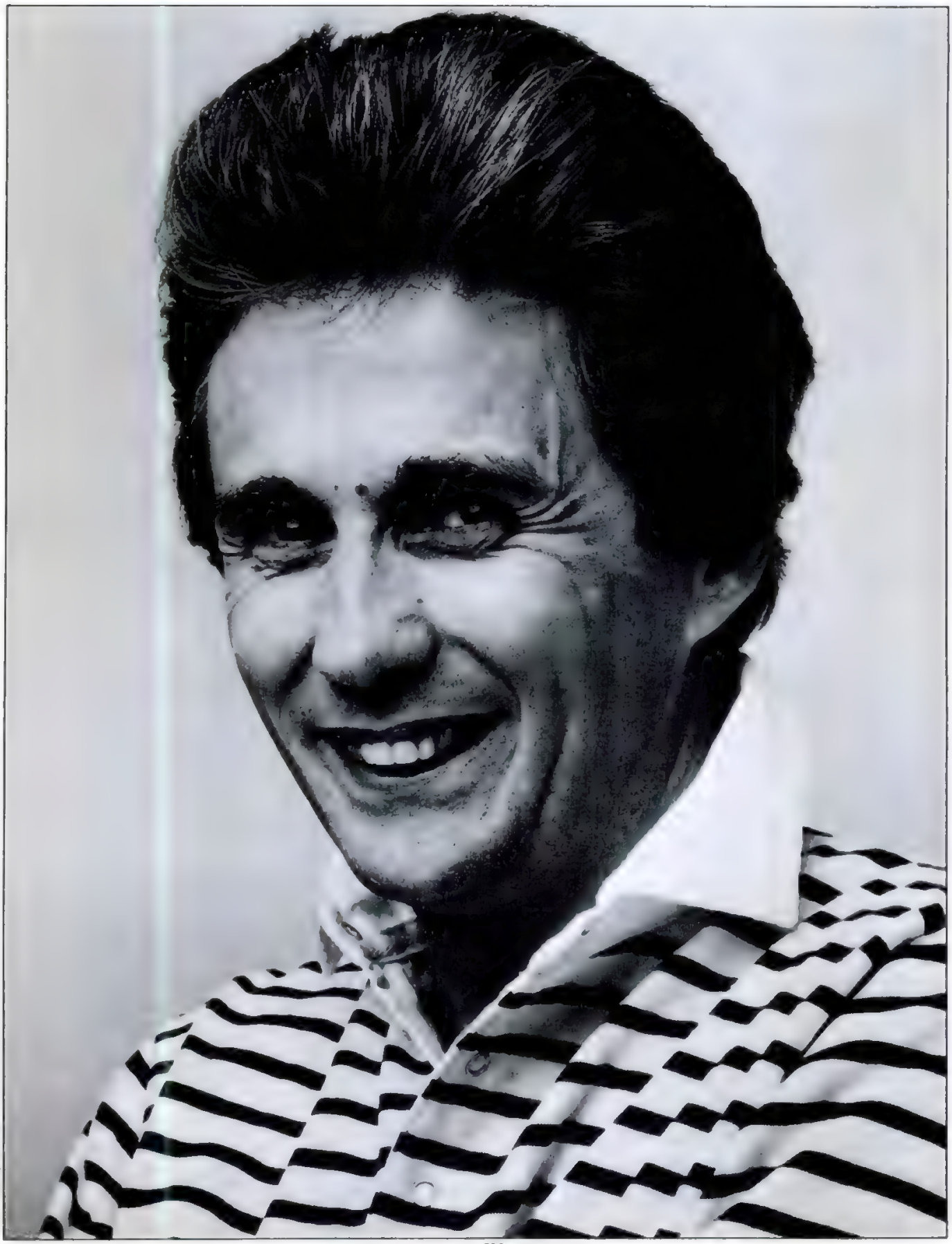


Photo courtesy of Bodi.

IBM EYE/MARTIN PORTER

Charlie Chaplin's business acumen rivaled his creative genius. His image continues to pay off for his heirs—and for anyone who can afford to pay for the right to use it.

That's Why The PC Is A Tramp

The story of industry, of individual enterprise, humanity crusading in the pursuit of happiness.

From the titles, Modern Times (1935)

Not so very long ago, Billy Scudder (opposite page) had little use for a computer, let alone the double disk drive IBM beauty he now has stationed in his home. Until 2 years ago, he probably couldn't afford to buy one. Now, it's only fitting that Scudder have his own deluxe IBM PC. Why? Because he helped make the IBM PC famous. Or the PC made him famous.

At least it has made his interpretation of Charlie Chaplin famous. His Charlie is the one you see in ads for the IBM PC. It is Billy Scudder's quirky though authentic impersonation of this century's greatest funny man, Charlie Chaplin, the personification of twentieth century pathos and determination, that has come to represent the latest profit center of the IBM conglomerate. This 5-foot, 6-inch actor, who once played Chaplin's Little Tramp 8 hours a day for tourists at the Knott's Berry Farm amusement park in southern California, represents a landmark product in the short history of personal computing—and potentially an entire industry of software and compatibles.

"They had been auditioning Chaplins in New York and Los Angeles," recalls Scudder. "It was a typical talent search where word spreads and all the Chaplins come out of the woodwork. For my first audition, I came right from Knott's Berry Farm where I had been doing Chaplin all day. I've been working most of my life as a performer and supporting myself this way. I also sing and dance and write, but Charlie was one of the things that kept giving me money continually and I kept doing it. I kept wanting to be me, but people kept wanting me to be Charlie."

The creative team at Lord, Geller, Frederico and Einstein (LGFE) certainly liked Scudder's Chaplin. LGFE is the New York advertising agency hired by IBM to create an image for IBM's entry into the personal computer marketplace.

"They said it was my eyes that attracted them," said Scudder. "I don't look like Charlie. We are about the same size, but my nose and mouth are very different. The eyes do it. I look vulnerable. That's the key to Chaplin," Scudder explained. "He did all those tricks and mischief, but he was still vulnerable."

IBM wanted vulnerability. Its marketing strategy was to take a collection of electronic chips and promote it in a friendly, useful, non-threatening package. It worked for Apple and Commodore; why not for the folks from Armonk, New York, who had long enjoyed if not encouraged the image of a powerful corporate giant with the code name Big Blue? If IBM was going to get a foot in the door of schools, households, and small businesses, it would have to strip off its white shirt and blue suit respectability and replace it with a dusty coat and a pair of baggy pants.

"He's like you or me," Scudder continued, referring to the master. "He is the essence of all of us. I have done most of the clowns in history—from Pierrot to Harlequin—and none of them register as much as Charlie. People read Charlie and feel comfortable with him. He is as vulnerable as we all are in this great big world."



The Tramp In Modern Times

Forty-five years before IBM introduced the PC, calling it "a tool for modern times," Charlie Chaplin produced a contemporary statement of his own: an 85-minute film parody of industrialization that he wrote, starred in, scored, cast, directed, and produced.

In the mid-thirties, when Chaplin's opus, *Modern Times*, was made, he exerted absolute control over the expression of his talent. He would continue to exercise similar artistic authority throughout his life—and even afterward. By doing so, he took the Little Tramp, whom he first introduced to America in 1914, and created a universal classic. In the course of Chaplin's movie career, the Tramp appeared 70 times. Ironically, its last appearance was in *Modern Times*, though the dignified vagabond would live long after 1935 as a trademark that Chaplin shrewdly developed as a minor industry.

Modern Times itself was more than a film vehicle for Chaplin's newest wife, Paulette Goddard. It was his treatise on industrialization, a springboard for his increasingly public socialist sentiments—sentiments that would cause him to be hounded during the McCarthy era and that eventually forced him from his adopted country.

Given this background, it may seem odd that IBM, a great symbol of corporate America whose name is synonymous with the silent power of big business, would adopt such a potentially controversial symbol for its bid to share in the consumer's discretionary dollar. Such ironies are the stuff of PhD dissertations, not clever marketing. While erudite film buffs may enjoy exploring the implications, marketers understand that the Little Tramp has little to do with the real story of its creator. Like Bogie, Marilyn, and Elvis, the Little Tramp is an emblem—suitable for framing or silk-screening on everything from T-shirts to coffee mugs. Other dissertations might highlight further ironies, particularly the adoption of the Little Tramp as a micro-age mascot in view of Chaplin's cinematic slap at progress in *Modern Times*. To this, the computer contingent



can readily retort that *Modern Times* is not about industrialization, but human freedom. As many of the early PC ads and commercials implied, the Personal Computer, like a 16-bit Moses, can help to set us free.

What would Chaplin have thought about the Personal Computer? Billy Scudder thinks he knows. "I think at first he would have been indifferent. That's how he would feel until he used one on one of his scripts. Then he would have said, 'Oh, yeah, this is great!' He would have used it a lot. He was one of those people who loved to manipulate. That was why he wrote, directed, and produced everything himself. He was a user of technology."

Roy and Bubbles

When Charlie Chaplin died, on Christmas Day 1977, his Little Tramp was not cast unprotected into the world of the public domain. A businessman as shrewd as Chaplin wouldn't allow such a thing to happen to such a dear and lucrative friend. In 1978, the copyrights to the Little Tramp and all of Chaplin's movies were

acquired by an enterprise known as Roy Export, based in Liechtenstein, a principality on the Rhine between Switzerland and Austria, favored by many as an international tax haven. Although the nature of Roy Export's corporate structure and shareholders is not publicly known, it is generally surmised that the company represents the remaining members of the Chaplin clan.

IT HAS since become common knowledge that it's not nice to fool around with Roy Export, or for that matter, with its French merchandising arm, "Bubbles."

Roy Export protects Charlie Chaplin's heirs and his public image with the power of some of the biggest legal guns throughout the world. From its public dealings, it is apparent that the company has a vested interest in protecting the Chaplin name and image for as long as possible, ensuring, of course, that the family gets a cut along the way.

In reporting Chaplin's obituary, the Columbia Broadcasting System used various film clips from the Chaplin film classics *The Gold Rush*, *The Kid*, *The Circus*, *City Lights*, *Modern Times*, and *The Great Dictator*. The network was slapped with a lawsuit that led to a court-ordered payment of over $700,000 in fines. CBS argued that its right to report on newsworthy events shielded it from liability under the First Amendment. Roy Export said "hogwash" and collected its bundle after the lower court decision was upheld by the U.S. Court of Appeals.

It has since become common knowledge that it's not nice to fool around with Roy Export, or, for that matter, with its French merchandising arm, "Bubbles."

IBM went to Bubbles in 1981 to license the trademark of the Little Tramp for its PC campaign. For an undisclosed sum, IBM gained exclusive rights to the trademark for personal computers and office products. Bubbles retained the right to review all Little Tramp advertisements or marketing material created for the PC campaign. The deal is renewable in the fall of each year, with IBM retaining the right of first refusal to continue the agreement. IBM has also licensed the title "Modern Times." According to Bubbles managing director Pam Pommier, there is a strong case for stating that even the Tramp's bowler and cane are covered under Bubbles' trademark.

Nevertheless, the success of the PC campaign and the product itself has spawned a legion of print and television imitators. In *PC Magazine*, Volume 1 Number 11, for example, 12 advertisements for software and product peripherals made either direct or indirect reference to the IBM Tramp campaign. References ranged from a mysterious Tramp-like arm in ads for IRMA to a casually placed bowler and cane. And the Tramp has appeared in television commercials for Wang, Radio Shack, and NEC.

What does Bubbles think about the fact that its Little Tramp is rapidly being adopted not only as the symbol of the IBM PC, but as a symbol of a new industry? Ms. Pommier's response was evasive.

"You mean that is really going on?" she asked.



The Tramp Goes to Court

In the United States, it has been going on for some time. For example, consider the case of Otrona. Collier Buffington, the head of a Denver-based advertising agency, had devised a clever Chaplinesque campaign for the portable (non-PC-compatible) Otrona Attaché computer. In the ad, a handsome mustachioed dude is walking down a flight of stairs, casually carrying the Otrona with one arm. Several steps behind, Charlie's Tramp is seen bumbling his way downward with a cane clenched between his teeth, trying to carry an IBM PC. "A little computer will set you free," says the slogan.

THE LITTLE Tramp is rapidly being adopted not only as the symbol of the IBM PC, but as a symbol of a new industry.

Buffington explained in an industry trade newspaper, "The Charlie Chaplin character is recognizable and people who might not know a lot about computers still know what the character means ... besides, it also allows a little humor to be injected into the ad."

Not for long. After four insertions of one-third page ads in the *Wall Street Journal*, Otrona was summoned with a cease and desist order by lawyers representing Bubbles. "What upset them was that our Tramp was believable," Buffington, now director of product management at Otrona, asserts. "Besides, all the IBM executives were certainly reading the ad every day on their train ride to Armonk. You better believe they saw it."

On advice of counsel, Otrona curtailed its Tramp campaign, though there was some discussion that the trademark could be challenged in several states. Buffington

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explained, "We are in the computer business, not in the lawsuit business. We made a choice. However, when I was contacted by the representative of the estate, I let them know what I thought. I told them that Charlie would roll over in his grave if he knew they were siding with IBM."

The legal challenge that Otrona's lawyers referred to is currently the topic of courtroom debate. It has long been understood that public figures have the right to collect a fee for any endorsement. After their deaths, however, that right becomes somewhat clouded.

In 1982, Alexander Cohen, the producer of the Broadway Marx Brothers revue *A Day in Hollywood, a Night in the Ukraine*, received a California state ruling that the heirs to Groucho, Harpo, and Chico had no rights to any of the show's proceeds. Reversing a lower court ruling, the judge stated that the brothers' schtick was not a commodity that could be passed on, thus protecting the rights of "creative persons to employ freely characters who are part of our common cultural heritage."

In an article in *Channels* magazine (March/April 1983), however, lawyer Tom Teicholz offered legal advice that such a lawsuit is not easy to win. A 1975 ruling on behalf of Hal Roach Studios against marketers exploiting the image of Laurel and Hardy without their permission—they own the rights—is often cited in royalty bouts. Meanwhile, Pam Pommier of Bubbles maintains that the fact that Chaplin exercised his trademark while still alive makes his case different. Still, Teicholz quoted Irwin Karp, counsel for the Author's League and the Dramatist's Guild, as saying that an actor's character passes into the public domain after his death. He explained, "Should we stop calling a Napoleon a Napoleon because his great-great grandchildren [reserve the] right of publicity?"

The Tramp Campaign

The IBM Personal Computer "House" ad (60 seconds) aired in 1981. The set is stark white with a giant cube dominating the frame, otherwise occupied only by Charlie, a white table, and a fully blossomed rose. During the course of the commercial, the box shrinks and unveils an IBM PC. It is the first commercial for the new product, the Tramp's first role. The announcer reads:





The very first computers seemed as big as houses and so mysterious that for most of us, the computer was behind a closed door. But IBM was thinking how to make the computer more useful, and as one good idea led to another, it began getting smaller, faster, less expensive, easier to use. IBM made its personal computer to help a person be more productive, to help a person be more creative, and those are good reasons for a person to feel good . . .

A large photo tacked over the manual typewriter in Tom Mabley's office at Lord, Geller, Frederico and Einstein, depicts an irritated Little Tramp and a bruiser with a grin who has just snatched his bowler and cane. The bruiser is Mabley, senior vice president of creative at LGFE and head of the team that devised the IBM/Tramp liaison. With the photo as evidence, Mabley undoubtedly is capable of loosening up, but apparently not for interviews. You don't loosen up about IBM in public and expect to represent it for long.

IBM, however, wanted a "loose" image for the PC. This was the reason the corporation went to LGFE, known on Madison Avenue as a "creative" shop run by "creative" types. It did not start out 15 years ago as such. LGFE is a wholly owned (though autonomous) subsidiary of J. Walter Thompson, the worldwide advertising giant. LGFE is noted for its classy clients such as IBM, Steinway, Hennesey cognac, and *The New Yorker* magazine.

Mabley and the Tramp are still at work, having just completed a new summer TV ad (pending IBM approval at presstime) and having recently launched a PC-XT print campaign that features two roses (instead of one) and the slogan "Power to the Person." (Was Abbie Hoffman contacted for licensing rights?) *Business Week* predicts that IBM will spend $13 million on Personal Computer advertising this year. Chances are excellent that the company will re-license the Tramp from Bubbles again this fall.

At the time Mabley moved to LGFE from J. Walter Thompson in February 1981, the PC was known only as "Acorn." The project had been introduced to the agency the month before, and IBM had already slated an August 1981 launch. Deadline pressure and much more was already in full gear.

"It was a landmark," Mabley explained, "it was the the first personal computer offered by IBM. It needed advertising that would be worthy of the event. It also had to be distinguished from other products made by the company. Our creative teams went to work and there were lots of different responses. There was one campaign that employed the Muppets. And of course, we evaluated the use of a spokesman. A spokesman is a natural thing you cover. But the environment at the time, in terms of competitive advertising, was chock-full of spokespeople . . . Cavett, Cosby. Some of them are very good and very charming and memorable. It was this that led to a different kind of spokesman . . . a silent one. We thought of Marcel Marceau. It was logical for this to bring us to Charlie."

IBM, however, wanted a "loose" image for the PC.

Once Charlie was selected and approved, authenticity became the creative

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call word of the ensuing campaign. The designers wanted everything to be true to Charlie. David Horowitz's music for the TV spots was written from Chaplin's own score sheets (Chaplin wrote the score for *Modern Times*). Billy Scudder received the nod because he was more than just a mimic; Tom Mabley called his attraction "intelligence." Meanwhile, Scudder was reminded throughout the shooting to "be Charlie." An early attempt to dress the Little Tramp in brown was countered by the actor's demand, "Charlie didn't wear brown." Though the agency maintains the rose was added for color and a symbol of creativity, Chaplin aficionados recognize it as a prop from *City Lights*.

EVERYTHING was done to make this Charlie human, even including a kiss at the end of the "Bakery" commercial.

"What surprises me most about all the other advertisements around, more than their references to the Tramp, is how the rose has been adopted as a symbol. There was nothing unusual about the flower. It probably had been used in business machine ads before. This is really the surprise," said Mabley.

The references to *Modern Times* as an anti-corporate statement came as no surprise. Everything was done to make this Charlie human, even including a kiss at the end of the "Bakery" commercial, noted by some as the first kiss ever to appear in an IBM spot. Besides, according to Mabley, "What Chaplin described was more than mechanization, but the frustration of mechanization. By bringing Charlie into real modern times, we were able to show how he is finally able to conquer that frustration. It is clear that technology is now on his side."

"On his side" means non-threatening, which in common computer parlance means "friendly." Why not chic, sophisticated, and sexy? When will computer makers begin to make the micro user feel like he just parked a V-8 sportscar instead of a kiddy car in his driveway?

"I think friendliness is going to be with us for a while," said Mabley, but as with the development of any product, sophistication will come. You can draw the comparison with the automobile. Remember "How to Test Drive the IBM Personal Computer?" People will always be looking for a faster car, the better handling car, the combination of consumer benefits that add up to a consumer preference. The more time people spend with computers, the more sophisticated the image will get. Then you will start seeing chic and sophisticated. For now, it's friendly."

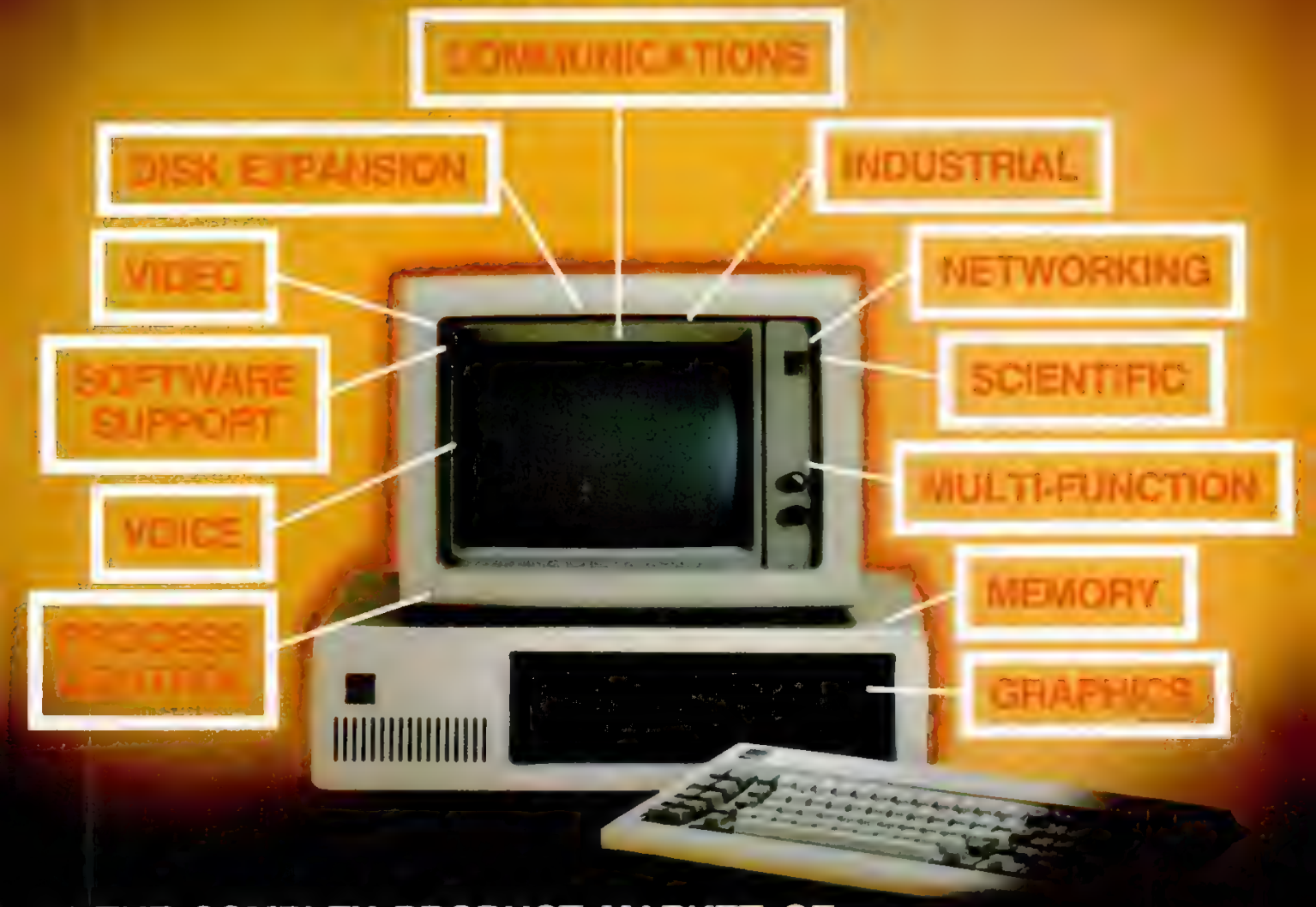
Will the Tramp himself evolve in the course of the campaign? Will he have his pants tailored and spiff up his cutaway coat? According to Mabley, IBM intends to stick with the traditional Tramp.

How has the campaign changed Mabley? If the PC is indeed a product that can help transform people's lives, how has the IBM computer affected the creative director? Mabley's reply referred to the typewriter he currently uses and upon which, most likely, the Tramp campaign was first developed: "The personal computer will probably affect my life more when I finally get one into this office." */PC*



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TECMAR IS THE SAFE DECISION FOR TOMORROW'S PRODUCTS

TECMAR THE ONLY NAME YOU'LL NEED TO KNOW

CIRCLE 494 ON READER SERVICE CARD

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ComNet™ FROM TECMAR

NETWORKING
- Ethernet
- Electronic mail
- Device sharing
- No dedicated server required
- Operates with no floppy-based system
- Remote job execution
- File lock out
- Password protection
- Server back-up available

TELEPHONE SUPPORT
(available through modem board)
- Autodial - with extended telephone numbers
- Auto Redial
- Call Forwarding
- Length Of Call Indicator
- Directory Support - with unlimited number storage
- Message Support - either leave or obtain messages. Receive messages remotely
- This unit (with a handset) substitutes for a telephone

MODEM
- Gateway to networks
- Electronic mail
- Device sharing
- Remote job execution
- File lock out
- Password protection
- 300 to 1200 baud modems available
- Data in network can be obtained by decoding touch-tone sequence or through voice recognition prompt
- Respond to remote terminal
- Access dictating systems on network. Control them by touch-tone decoding
- Programs or calculator can be used remotely. The touch-tone keypad can be used to provide numeric input to programs or the calculator from a remote site (programs are loaded by decoding touch-tone sequences).

VOICE
- Voice mail
- Voice annotated text
- Voice messages

VOICE RECOGNITION
- Transparent keyboard. Speak instead of type
- Give commands over phone

ComNet

ComNet is designed to meet your total communication needs including computer to computer (networking), person-to-computer and person-to-person communication requirements for data and voice.

The network protocol employed is the industry standard high speed Ethernet which permits a number of IBM PC's to be linked together by ordinary thin coaxial cable. In addition to its own computer's power, a user has the availability of other devices which are also attached to the cable - such as various printers, plotters, large disks, etc.

All versions of ComNet include an Ethernet interface and conversion of voice into data and back again. This enables one to give and recieve spoken messages from any location, as well as storing the message for later transcription. The SECRETARY is the basic system with these features.

SECRETARY $1695[1]
- Ethernet Link
- Ethernet Companion
- ComNet Software



EXECUTIVE $2995[1]
- Ethernet Link
- Ethernet Companion
- Modem (300 Baud)[2]
- Voice Recognition
- Microphone
- ComNet Software

[1]With **1st MATE**, **2nd MATE**, or **3rd MATE** in Station

[2]Option: 1200 Baud Modem

IMPROVE PRODUCTIVITY THROUGH TOTAL COMMUNICATIONS SUPPORT

DICTATING SYSTEM

- Control the Pearlcorder X-02 or XR dictating system at local or remote stations through keyboard or foot pedal control or by telephone touch-tone decoding. Allows you to dictate to the "ComNet" system from any place in the world.

FOOT PEDAL SUPPORT

- Controls dictating system
- Controls response to voice recognition

SOFTWARE

- Time Management - alerts you to appointments at any station you are logged onto.
- Message Management - either electronic mail or voice.
- Clock/Calendar - either visual or audible
- Calculator - either visual or audible
- Voice Management - oversees voice mail, voice message and voice annotated text operations

These software packages can be operated through voice recognition (even over telephone) with voice output, through the telephone keypad with voice output or through the IBM PC keyboard

The MANAGER system adds a modem which can turn the PC into a telephone if a separate handset is added. The modem enables the MANAGER to receive unattended voice and data from any telephone in the world. The MANAGER can key in commands thru the decoding of the tones in the telephone keypad.

The EXECUTIVE is the most complete implementation of ComNet, adding computer recognition of spoken commands. An executive might phone the PC to leave or retrieve messages or request specific information. The PC, in a spoken voice, can request the user's access code (or respond to questions regarding which of several options is desired). The EXECUTIVE has the option of keying in answers or commands with the phone's tone dialing buttons, or simply speaking the answer or commands.



MANAGER $1995[1]

- Ethernet Link
- Ethernet Companion
- Modem (300 Baud)[2]
- ComNet Software

HARDWARE

ETHERNET LINK **$950**

Permits communications between computers at extremely high speeds (10 Mbits per second). The transmission mode is through single video coaxial cable with easy-to-use BNC connectors.

ETHERNET COMPANION **$695**

Performs the function of voice digitization and voice replay, dictation machine control and foot pedal control. Also contains interface for mouse.

MODEM

103 (300 Baud) **$295**
212A (1200 Baud) **$695**

- 103 (300 Baud) or 212A (300 or 1200 Baud)
- Pulse/tone automatic dialer
- Dual tone DTMF receiver (decodes touch tones)
- Auxiliary voice circuit
- Auxiliary, optically coupled, ring indicator output (capable of being used for auto power-on)
- Can replace telephone with the addition of a handset

VOICE RECOGNITION **$995**
MICROPHONE **$170**

User-dependent 100 word recognition (200 words optional) with 98% accuracy. Permits computer to respond to voice input.

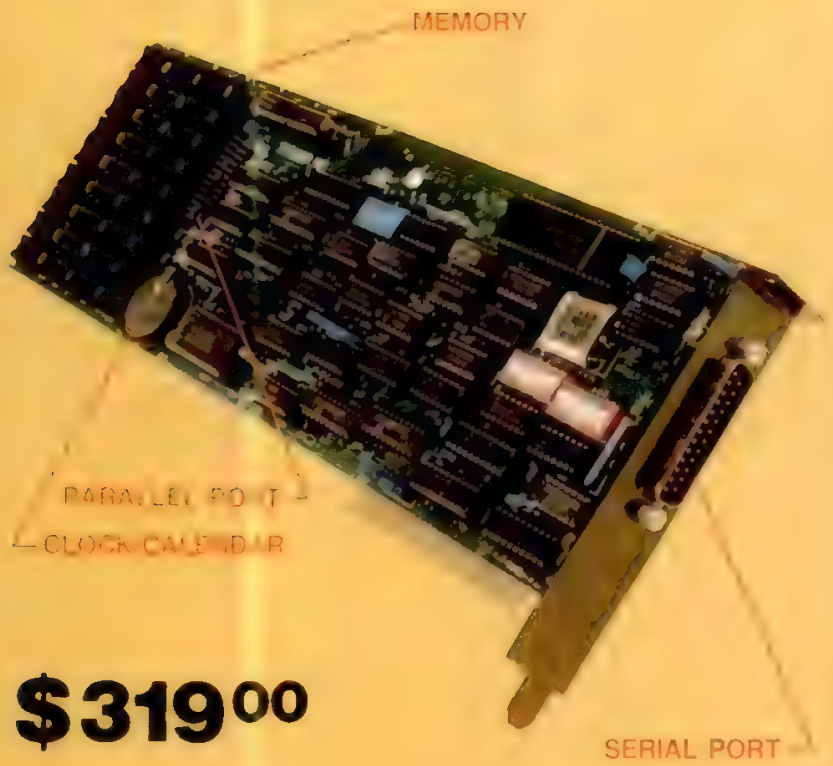
MORE TO COME...
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AVAILABLE IN JULY, 1983

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FIRST FROM TECMAR



$319.00

1st MATE™

$319/Unpopulated Memory
$389/64K $469/128K
$539/192K $589/256K
TECMAR'S TOP OF THE LINE MULTI-FUNCTION BOARD

Performs eight (8) key functions in one (1) expansion slot with upgradeable (expandable) memory.

- 0 to 256K **Memory** - fully socketed for easy field upgrade
- Versatile - each 64K fully addressable
- **CLOCK/CALENDAR** - with easily replaceable battery for back-up
- **SERIAL PORT** for communications - PC compatible (COM1, COM2 or other)
- **PARALLEL PORT** for printer - PC compatible (LPT1, LPT2 or other)
- **RAM SPOOLER** - easy to use - allows printing to become background task - choice of 8 memory sizes
- **SPEED DISK** - simulates ultra high speed disk
- **AUTO-TIME** - provides automatic insertion of date & time at power on
- Accepts exclusive **PAL** Option to restrict certain information on a "need to know" basis or to protect software
- Includes all connectors and cables
- Compatible with COMPAQ personal computer



Two 64 KILOBYTE MEMORY KITS will upgrade your 128K PC to 256K

64 KILOBYTE MEMORY KITS $85
USE TO UPGRADE THE PC XT SYSTEM BOARD OR PC-MATE 1st MATE



$295.00

2nd MATE™ $295

A wide range of I/O options - 4 ports with a clock/calendar when memory is not necessary

- Two (2) **SERIAL PORTS** for communications, quality printers, modems - PC compatible (COM1, COM2 or other)
- Two (2) **PARALLEL PORTS** for printers - PC compatible (LPT1, LPT2 or other)
- **CLOCK/CALENDAR** with easily replaceable battery for back-up
- Accepts exclusive **PAL** Option to restrict information on a "need to know" basis or to protect software
- Two (2) cables - one (1) serial, one (1) parallel - included
- Compatible with TI Professional and COMPAQ personal computers

PC MATES™ - A COMPLETE SERIES OF MULTI-FUNCTION MEMORY/COMMUNICATIONS BOARDS THAT GIVE YOU TOTAL VERSATILITY TO CONFIGURE YOUR SYSTEM.

3rd MATE™ $445
ON-BOARD MODEM AND I/O OPTIONS

NEW!



Pulse-dialing supported with no external cables or wiring. All you need is a phone jack.

- **MODEM** - 300 Baud, Bell 103, auto-dial, pulse-dialing supported, on board
- **SERIAL PORT** - for additional communications - PC compatible (COM1, COM2 or other)
- Two (2) **PARALLEL PORTS** for printers - PC compatible (LPT1, LPT2 or other)
- **CLOCK/CALENDAR** with easily replaceable battery for back-up
- Designed to accept exclusive **PAL** Option to restrict certain information on a "need to know" basis or to protect software
- Two (2) cables - one (1) serial, one (1) parallel - included
- Compatible with TI Professional and COMPAQ personal computers

$445.00

Scribe Tender™ $195

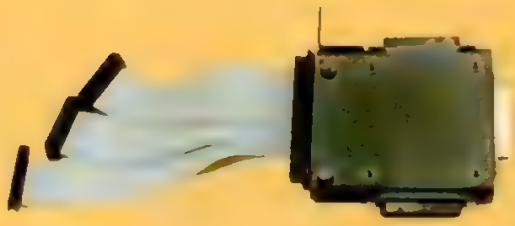


Combines three (3) IBM options on one (1) multi-function board

- Two (2) asynchronous **SERIAL PORTS** identical to IBM ports, (COM1, COM2 or other) fully programmable
- Complete status reporting
- One (1) **PARALLEL PORT** emulates IBM printer adapter board, (LPT1) including software capability
- Compatible with TI Professional and COMPAQ personal computers

$195.00

Triporter™ $95



Designed to provide easy access to the connectors on multi-function boards, such as the Tecmar **Scribe Tender**, **1st MATE**, **2nd MATE**, **3rd MATE**. Provides for mounting of up to four (4) male or female DB25 connectors on back of IBM PC or Tecmar Expansion Chassis slot. (Cables $25 extra)

- Easy to install
- Accommodates 26 conductor cables
- Mounts in expansion slot opening
- Housed in steel case

$95.00

THE TECMAR PRODUCT LINE ADVANTAGES
- All Tecmar products carry a full one (1) year warranty
- Guaranteed 72 hour repair service (24 hour average)
- Total compatibility with IBM PC and all Tecmar products
- Proven reliability
- Strong manufacturer's support with immediate access to Customer Service
- Largest selection of IBM PC compatible products in the world

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- the new SyQuest **5 Megabyte removable** cartridge Winchester disk drive
- complete, easily installed in IBM PC or available in IBM-compatible Tecmar expansion chassis
- new Tecmar **superspeed** controller
- Tecmar disk sharing for up to 4 IBM PCs
- your best solution for **mass storage**, and the most sensible back-up system available.

We believe this is the future in storage because we have proved its **reliability** and its advantages. The new removable cartridge gives you unlimited memory at a lower price tag than the basic Winchester at comparable speed.

$1795 complete with controller & cartridge

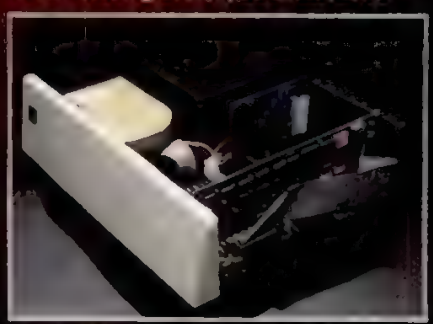
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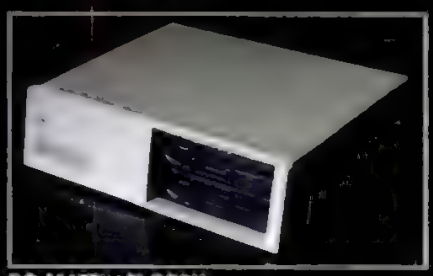
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The first and *only* complete line of fully compatible expansion options for IBM PCs, including every type of disk drive.



NEW SHARED WINCHESTER PC-MATE™
Our new GT subsystem upgrades our original with 3 times faster speed, sharing for up to 4 IBM PCs. Controller Board available for upgrade on trade-in.



PC-MATE™ FLOPPY
Controller Board will handle 5¼" and 8" disks. Winchesters can be installed in our floppy subsystem cabinet.

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PC-MATE BAK-PAK WINCHESTER BACK-UP 6.25 MEGABYTE DISK PACK $1595.00

The "Bak-Pak" System comes in an IBM-Compatible/**PC-MATE** Mini-cabinet complete with software, power supply, controller and cables. Features removeable media in packs with 6.25 megabytes of formatted storage per pack. Additional packs available at $95.00.

The controller substitutes for the IBM floppy disk controller, so no additional slots are necessary. Also can be used as primary high capacity storage system.



5 MEGABYTE REMOVEABLE CARTRIDGE WINCHESTER FOR BACK-UP $1995.00

Comes in IBM-Compatible/**PC-MATE** Mini-cabinet complete with software, power supply, controller and cables.

Can be used as the stand-alone primary high capacity storage device.

WATCH THIS SPACE

New! Tecmar Tape Back-Up Coming Soon

HIGH CAPACITY STORAGE 26 MEGABYTE WINCHESTER $3995.00

Comes in IBM Compatible/**PC-MATE** Mini-cabinet complete with software, power supply, controller and cables.

- Compatible with all Tecmar disk-expansion systems
- Allows disk sharing for up to four (4) IBM PCs

26 Megabyte Winchester is also availabe in IBM-Compatible **PC-MATE** Expansion Chassis which offers an additional five (5) expansion slots and independent power supply for $4295.00.

Other Winchesters From Tecmar:

- 10 Megabyte in Mini-cabinet - $2495.00
- 15 Megabyte in Mini-cabinet - $2895.00
- 10 Megabyte in **PC-MATE** Expansion Chassis - $2795.00
- 15 Megabyte in **PC-MATE** Expansion Chassis - $3195.00

Other configurations of fixed Winchester, removeable cartridge Winchester and 8" floppy disks are also available from Tecmar. Contact your local dealer or check Tecmar's full-line catalog for details.

BACK-UP SYSTEMS SOLUTIONS

HIGH CAPACITY STORAGE SOLUTIONS

Call or write for the latest catalog of **PC-MATE** peripherals from TECMAR. Updated continuously as new products come on-line.



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TECMAR'S AFFORDABLE INDUSTRIAL/SCIENTIFIC LINE FOR THE IBM PC

CONFIDENCE IS NO EXTRA CHARGE.

COMPATIBLE
All TECMAR products are designed to be fully compatible with each other and the IBM PC for smooth, trouble-free performance in your system.

SUPPORTABLE
Our philosophy of total support adds uncommon value to your TECMAR products. All TECMAR boards feature a one-year warranty, with guaranteed 72-hour maximum repair turnaround on all standard products. Replacement loaner units are available. Thorough and straightforward documentation comes with each unit. Our customer service staff is available to answer questions or solve your problems.

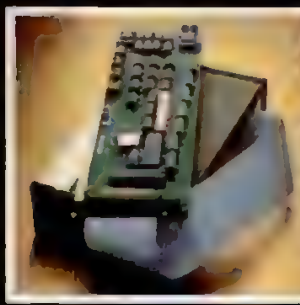
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Our products allow easy expandability so your system capabilities can grow with your needs.

There's more! TECMAR's broad line of compatible IBM PC Industrial/Scientific products includes:

- High Resolution Graphics
- 5¼" and 8" Floppy Disc Controller
- Video Digitizer
- Video Cassette Recorder Controller
- Speech Synthesizer
- Voice Recognition
- D/A Converter
- Stepper Motor Controller
- EPROM or EEPROM Programmer/Reader
- Static RAM/ROM
- CMOS Memory



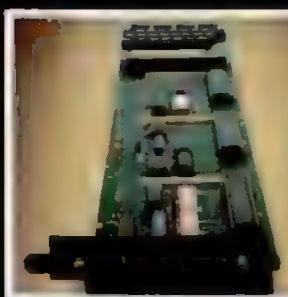
IEEE488 INTERFACE $395
plus SOFTWARE $95
Board implements IEEE488 industry standard to enable PC to operate as system controller or as an addressed talker/listener. Has DMA and interrupt capabilities. Available library of machine-language subroutines called from BASIC or FORTRAN for data transactions with GPIB. Order #20030 INTERFACE #30030 SOFTWARE.



LAB MASTER™ $995
Sophisticated system that includes 16 channels of 12-bit A/D with a 30KHz conversion rate, 2 channels of 12-bit D/A, five timer/counters and three 8-bit parallel ports. Options include programmable gain up to 1000, 14-bit accuracy, 40 and 100 KHz conversion rates, up to 256 channels. Order #20009.



LAB TENDER™ $495
Economical and versatile system designed for data acquisition and control applications. Includes 8 channels of 8-bit A/D conversion, 16 digital I/O lines, D/A conversion, five timers, and three parallel ports. Order #20028.



BASE BOARD™ $345
Digital Input/Digital Output board with four sections of 24 DI/DO lines. Each section can be used as a stand-alone DI/DO interface or with a daughter board for prototyping or special functions such as opto-isolated input or opto-isolated output. Order #20025.

We are proud to offer the largest line of options available anywhere for the IBM Personal Computer. All Tecmar products are designed with advanced technology as it becomes available. We add new products monthly like the PC-MATE removable Cartridge Winchester drive. TECMAR offers complete reliability and backs it up with support.

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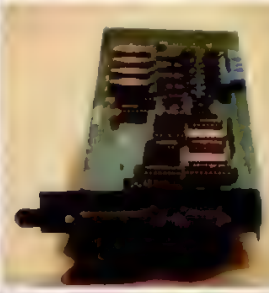
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SOLUTION-ORIENTED DESIGN WITH THE USER IN MIND

A FULL LINE OF PROBLEM SOLVERS



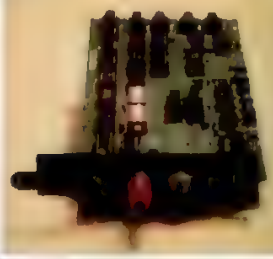
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...curate, high-speed unit has ... independent channels of 12-bit ...-analog conversion that can be double-buffered (all four (4) output ... change simultaneously), with ... 8-bit parallel ports. Can con... 24 digital devices.



SPEECH MASTER $395

...r any application where verbal ...esponse has proven most effective. ...ses the VOTRAX phoneme-level ...peech synthesizer for unlimited ...ocabulary, and the NATIONAL ...ocabulary-level synthesizer, for ...peech synthesis of high-quality with ...mited vocabulary. Features an on-...oard speaker with provision for exter... speaker or amplifier.



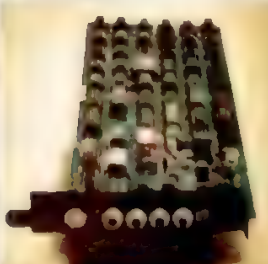
VIDEO VAN GOGH $345
plus SOFTWARE $95

...video digitizer that interfaces TV cameras to the PC. Will digitize a ...black and white picture in six (6) ...seconds with resolution of 256H by ...240V pixels and 256 grey levels. Soft... ware library sub-routines allow ...digitization and display of a video pic... ...transfer to disk storage, image ...printing, cursor control and point...



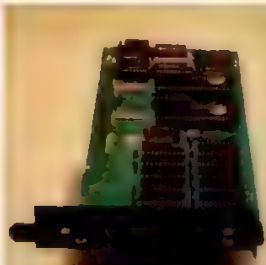
DEVICE MASTER $245
plus SOFTWARE $35

Can be used for energy management, security, or just for convenience. This interface for the BSR X-10 unit turns electrical outlets on or off and dims lights without additional wiring. It uses a direct AC connection, avoiding damage to the computer. Contains a clock/calender with alarm and battery back-up.



VIDEO CASSETTE RECORDER CONTROLLER $495

...ontrols all remote functions on the SONY SC2500. Codes each frame so ...user can locate any particular ...on the video tape, adds frame ...ber information to any length ...retrieves and displays exact... e by frame number, and when ...with TECMAR'S GRAPHICS ...TER, a computer display can be ...-imposed on the video picture.



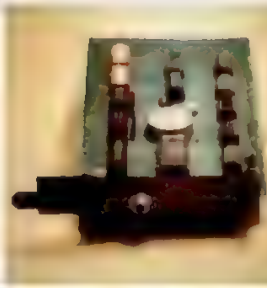
STEPPER MOTOR CONTROLLER $495

...ports controller that gives you in... ...Drives motors through the IBM PC ...parallel port. Will control four-phase or pulse se... ...motors and has two (2) in... ...dependent, buffered and labeled 8-bit TTL input ports and two (2) indepen... ...buffered and labeled 8-bit TTL ...output ports.



E+EEPROM PROGRAMMER/ READER $495
E+EEPROM EXPANSION $595
E+EEPROM SOFTWARE $95

...ogrammer ... ...ZIF socket. The expansion system ...ca... ...The software is user-friendly, ...menu driven and supports the use of ... ...and economical 8K x 8 programmable ...EPROMS. Serial communication ...



...MASTER $13...

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Each day of instruction runs from 9:00 AM to 5:00 PM and costs $175. Extensive notes and a buffet lunch are included. Call or write for a detailed description of each class, and a copy of our impressive client list.
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PROGRAMMING/LINDSY VAN GELDER

Drawing from classical myths, detective fiction, and wild imaginations, adventure game authors are leading players into selcouth territory.

In Search Of The Exotic: New Directions In Adventure Games

Adventure, Microsoft's version of the original granddaddy of the adventure game genre (and the first game of any kind offered for the IBM PC when it was introduced nearly 2 years ago), put me in a state of high dudgeon. Who the hell cared about finding a stupid magic rod and waving it to make a bridge magically appear across the crystal fissure? Maybe it would have been a lot more fun to, say, lure the fierce green snake to the edge of the fissure, throw your keys in the snake's eye, bop it over the head with your lantern, wait for rigor mortis to set in, and then use its body as a causeway. (Don't snicker, this is as logical as waving wands or muttering "xyzzy.") Or perhaps it might have been interesting to shinny down into the fissure just to see what the Colossal Cave rock formations were like. Maybe even have a picnic and invite the dwarfs to slice the salami with their wretched little axes!

In your basic old-style adventure game, of course, attempts to pull off anything unorthodox are usually rewarded with the computer's ultimate circuits-glazed-over snub: "I don't understand that word." This tends not to perturb those souls for whom the world in the game is mere window-dressing for the real action: the thrill of hunting down the single correct piece of the puzzle. For me—and, I suspect, for a lot of other folks who aren't math-whiz programmer types—the puzzle is incidental. My idea of a terrific adventure game, in fact, is one that's most like that perennial linear entertainment form, the novel. You know: plot and characterization, vibrant dialogue, vivid descriptive passages, witty asides, and, above all, a world as compellingly real as L. Frank Baum's Oz, Sir Arthur Conan Doyle's Baker Street, Mark Twain's Missouri, or George Eliot's Middlemarch. Microsoft's *Adventure*, alas, is about as literary as IBM's *Guide to Operations*.

WHO THE HELL cared about finding a stupid magic rod.

More Than Adventure

I recently revisited the adventure genre, however, and while I'm not about to burn my books or rip up my membership in the International Wizard of Oz Society, I have to confess that I'm feeling a

How to Save Money on Your IBM Purchase

Buy the IBM PC from your local dealer. Get the 1-Drive System, the DOS, and the Monitor adaptor. Then order any of these items from us and **SAVE** up to **$800.00** on fully compatible, high quality components. In many cases, we use the same brand equipment that IBM sells for as much as twice the price!

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320 K Disk Drive	Tandon or CDC	529.00	**$260.00**
Color Monitor	Amdek	680.00	**$549.00**
Green Monitor	Amdek	345.00	**$220.00**
Printer Cable	_____	55.00	**$ 45.00**
Graphics Printer	Epson or Star	595.00	**$499.00**
64K RAM Chips (Set of 9 chips)	_____	350.00	**$ 79.95**

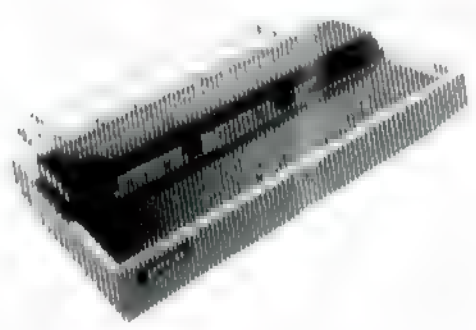
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Mail Merge (Mailing List System)	Sugg. Ret. 150.00	Our Price	**$199.95**
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little less curmudgeonly. Adventure games are evolving from a hacker's addiction into what can sometimes be an English major's delight.

One newish trend is adventure games

ADVENTURE games are evolving into what can sometimes be an English major's delight.

with color graphics; another up-and-coming trend (at least for the PC; it's old hat for Apple owners) is the multi-disk game. Still another is the trend to reach beyond the caves-and-graves imagery of the earlier games and borrow from other literary traditions, such as science fiction, mysteries, or classics.

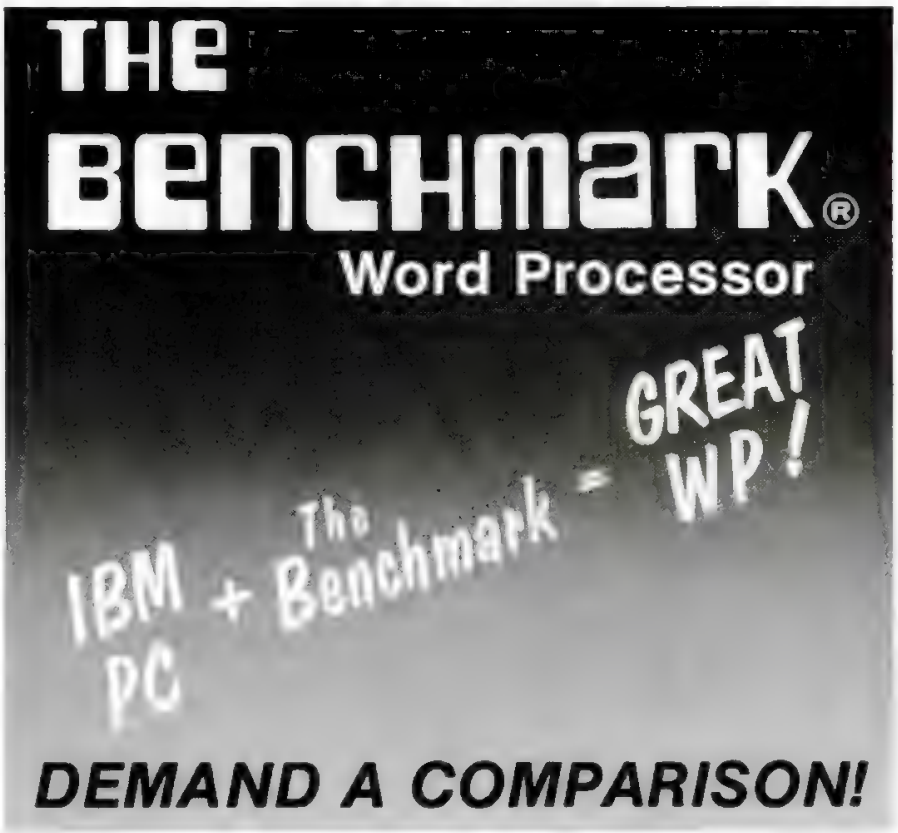
All these features are apparent in SierradVenture's *Ulysses and the Golden Fleece*, the world's first double-disk, hires Greek myth. As the game's manual (printed on fake ancient parchment) notes, "knowing a bit of mythology and the Classics—a familiarity with Ulysses' adventures—also will help you survive."

If you do know a bit of mythology, but don't remember Homer's mention of Colossal Island, don't be put off; the game is fun. It is an eighties version of the classics comics that so appalled my teachers when I was a kid. (What's next? "Close Encounters with Scylla and Charybdis"?)

Other happy trends include snazzier locales and just plain better writing. Norell Data System's *The Phantom's Revenge*" begins in a prison cell; in the first 5 minutes of play, the average adventurer staggers into a creepy old opera house with ghouls on the staircase, a low-life waterfront dive frequented by "big burly men in black shirts, fallen women, and computer freaks of all sorts," an island that sounds like something out of *The Count of Monte Cristo*, and a formal garden. "While you're here," the script reads, "please admire the rhododendrons." The computer won't let you pass until you do. Then it smugly agrees; "Lovely, absolutely lovely!"

Confronting the Creator

If there's a software company that deserves the title of the thinking man's (or woman's) adventure writers, it's Infocom of Cambridge, Massachusetts. One of the best presents any PC owner got for Christmas last year was Infocom's *Deadline*, in which the user plays a frazzled detective assigned to solve the death of one Charles Robner. Unlike most earlier games, *Deadline* allows players to communicate in (gasp!) English sentences ("Mrs. Robner, tell me about your husband.") rather than in two-word troglodyte baby talk ("give cage," "go building," "Me User, You Machine"). As in real life, time passes in



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CIRCLE 308 ON READER SERVICE CARD

Deadline, and things can go on behind your back. What the characters say and do are very much a function of how you behave. The characters—family and friends of the late Mr. Robner, all assembled in his rambling estate on the day his will is to be read—have distinct personalities in the best Agatha Christie tradition, and the game has 25 possible endings.

Best of all, though, is *Deadline*'s wealth of delicious tiny details, things that make it more like playing with a wonderful dollhouse or a model train set than a verbal mind-teaser. When you flush the toilets in the Robner mansion, they oblige with a "Whhooooossshhhhh!" Pick up the telephone and you'll hear a dial tone. If you look in the gilt mirror in the master bedroom, "a bedraggled and weary police inspector looks back at you. His look seems to be saying, "Look what the cat dragged in.' " Riffle through the dresser and you'll find not clues but stockings and underwear. You can even jump off the balcony if the spirit moves you, in which case, you "die," but not before experiencing an exhilarating sense of free-fall, as if the ground were rushing up to meet you.



Suspended, an interactive science fiction game from Intercom, features a functional game board and movable game pieces. The package is embellished with a face frozen in time—a cryogenic face.

Marc Blank is InfoCom's vice president for product development. If you're used to sales people hyping software that you wouldn't feed to a goat, you'll find Blank unique; he trashes his good software. Actually, Blank seems to despise every game that is more than 20 minutes old.

At the moment, Blank is high on an about-to-be-released thirties Hollywood private eye game called *Witness*, which, he insists, "makes *Deadline* look like garbage." Blank nearly swoons as he explains that the newspaper included as a prop is a copy of a real paper, and that the radio show the characters listen to is one that was actually on the air in Los Angeles.

Blank has to be coaxed into admitting that *Deadline*, if "rough" compared to *Witness*, was still a breakthrough. He concedes, for example, that he's a little partial

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CIRCLE 457 ON READER SERVICE CARD

to the book that lies on the library table, which, if you pick up, turns out to be a novelized version of *Deadline*. (No, you can't read the ending; the programmers are way ahead of you.) "We're very committed to the art form of interactive stories," he says. "More and more, we're really in the business of simulating the world."

jokers in your life), the game is subtitled: "A Cryogenic Nightmare." You, the user, have been selected to be put in suspended animation for 500 years while your mind directs a squad of robots who live in an elaborate underground labyrinth and supervise the food, weather, and transport systems on the surface of the planet. All the robots have distinct talents and personalities, of course. One spouts Shakespeare, another flirts outrageously. Your job is to manage them effectively or be replaced by one of your own clones. This mélange of administrative crisis management and high-tech, backstabbing doppelgängers adds up to a sort of "What Makes

WE'RE IN THE business of simulating the world.

Games to Come

In the future, Blank imagines games based on currently unimaginable themes. "Maybe it would be fun to play a game where you're a jerk who makes all the wrong career moves." Other plans are to have games written by famous authors (another new Infocom game, *Suspended*, is by Michael Berlyn, a published science fiction writer), more adaptations (Infocom is working on a game based on the character of Tom Swift), and eventually, games that integrate the microcomputer with interactive video disks. "My favorite thing," Blank says dreamily, "is when I hear people say that they used to come home at night and watch TV . . . who now come home and play adventure games."

The first three Infocom games—*Zork* versions I, II, and III—are all essentially plotless puzzles in the standard adventure mold. The original *Zork* was written in the mid seventies at the Lab for Computer Science at MIT, the same place where the original *Adventure* was written. *Adventure* was programmed in FORTRAN and *Zork* in the LISP-like language MDL. According to Blank, *Zork* was part homage to *Adventure* and part an attempt to do the same thing faster. Blank refers to another Infocom game, the science fictional *Starcross*, as "essentially Zorks in Space."

The just-released *Suspended* is a little more like *Deadline*, although it's also so weird that it's like virtually nothing else this side of "The Twilight Zone." Packaged in a chalk-white, life-sized death's-head-type mask with eye holes (a party prop guaranteed to thrill all the practical

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CIRCLE 218 ON READER SERVICE CARD

Sammy Interface?" It's nerve-wracking, but never dull.

I was never able to figure out what the ultimate goal of the game was (I kept getting replaced by my clone in what has to be one of the spookiest adventure-game scenes ever written), but apparently there are even more rarefied subsets within for those who are already adept at the arcana of managerial robotics.

One command, "configure," allows you to change certain elements of the game in order to challenge others. Another nice touch for players of all levels is a map of the complex, supplied with little stick-on buttons representing all the robots.



To successfully complete Infocom's science fiction game Starcross, players will need to utilize the four-color starchart. The game is packaged in a flying-saucer-shaped package.

Zorkaholics

Despite such high-class goodies, Marc Blank says that most of his customers are *Zork* nuts. (Blank, naturally, loathes the original primitive *Zork*, which is the best-selling game of all.) So fanatic are these people, in fact, that some 15,000 have joined the "Zork Users Group" (ZUG). They shell out hard-earned money for such items as maps, clues (written in invisible ink in incrementally broader hints, so that you needn't reveal more than necessary)—even T-shirts and a newsletter called (what else?) *The New Zork Times*. Beer mugs are threatened.

Who are these people? According to ZUG chief Mike Dornbrook, they come from as far away as Australia, Italy, and Hungary, and they "are the kind of people who, when they're struck, feel desperate." (Contrast this with Blank's description of many *Deadline* players, who "just hang around the Robner's house," snooping in the linen closet and such.) The one reader survey Dornbrook undertook provided "maybe not so much a cross section of *Zork* players as of the kind of people who tend to buy computers: young professionals, 20 to 40, mostly men, and a lot of computer programmers." What was less predictable to Dornbrook was the amount of time people spent in the underground empire—often 4 hours at a sitting. The average length of time to solve a game is 40 hours.

Dornbrook and Blank were actually old friends and lab partners from college. Blank was originally a medical student, and Dornbrook a "drifting" biology type. Unlike most of Blank's other friends, Dornbrook knew nothing about computer games—to this day he's never once put a quarter in an arcade slot—and when

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Ulysses and the Golden Fleece
Sierra On-Line Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614
(209) 683-6858
List Price: $32.95
Requires: 48K, one disk drive, color/graphics adapter.

The Phantom's Revenge
Norell Data Systems
3400 Wilshire Blvd.
P.O. Box 70127
Los Angeles, CA 90010
(213) 257-2026
List Price: Available from manufacturer.
Requires: 64K, one disk drive.

Adventure (Microsoft version)
Distributed by IBM Personal Entertainment Series
Boca Raton, FL 33432
(305) 998-6007
List Price: Available from manufacturer.
Requires: 32K, one disk drive.

Zork I: The Great Underground Empire
Zork II: The Wizard of Frobozz
Zork III: The Dungeon Master
Deadline
Starcross
Suspended
Witness
Infocom, Inc.
55 Wheeler St.
Cambridge, MA 02138
(617) 492-1031
List Price: *Deadline*, *Suspended*, *Witness*, $49.95; all others, $39.95
Requires: 48K, one disk drive.

Blank was beta-testing the Zorks, he called on his old friend to come give him an unbiased perspective. "They originally paid me $6 an hour," Dornbrook says. "I fell in love with the games, but I didn't tell them, because I thought they wouldn't pay me anymore."

As the games began to sell, people from all over the world were starting to call the MIT Lab for Computer Science and ask anyone who answered the phone how to get past the troll. With Blank's blessing, Dornbrook, who was moving to Chicago to go to business school, started an independent hint service that eventually grew into ZUG. "People *still* call MIT trying to find out how to get past the troll," according to Dornbrook.

Meanwhile, the ranks of adventurers grow, be they manic puzzle-solvers or people like me, who like to look under the Robners' beds just for the hell of it. ("No doubt you intended to find the bogeyman, but you're out of luck.") */PC*

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In the battle for the Communications Belt, PC-Talk III, the West Coast "People's Choice," holds its own against Smartcom II, the "Menu Kid" from Georgia.

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*In the far corner—in gray trunks with a rainbow-colored "Hayes" splashed all over them—a brand-new entry in the telephone ring. But it's one with a hefty corporate backer—*Smartcom II, *hailing from Norcross, Georgia. Known as "The Menu Kid," Smarty is as haughty as they come. Disdaining equipment it considers beneath its high intellectual plane, The Kid refuses to work with any but the Hayes Smartmodem. Still, it's a tough competitor, and its fans have paid up to 119 smackers each to watch it do its stuff.*

Gentleware, break non-ASCII clean, come out dialing, and may the best disk win!

PC-Talk III
The Headlands Press, Inc.
P.O. Box 862
Tiburon, CA 94920
List price: $35 (also available as Freeware; see article)
Requires: 64K, PC-DOS, one disk drive, asynchronous communications adapter, modem.

In its earlier versions, *PC-Talk* showed it had the moves. A scrappy competitor, it quickly became the darling of PC commu-

nicators everywhere. Written in BASIC, it uncomplainingly let you modify it for specific needs. Well designed, it kindly offered a handy on-screen summary of commands. Literate and chivalrous, it came with pages and pages of useful documentation right on the disk and gave you a routine to help print it out.

PC-Talk worked with just about any modem around. It could transmit and receive disk files and route information to a printer. It could store a directory of commonly used telephone numbers (including such long-distance services as Sprint and MCI) and make an auto-dial modem call them. It let you assign character strings to the Alt-numeric keys as well as the unshifted function keys. It was even able to tell you how long you'd been on the phone during your current call.

But if you weren't convinced of its talents, you could put the gloves on and go ten rounds with it. Under the Freeware program, *PC-Talk*'s author Andrew Fluegelman actually encouraged people to copy the program. You tried it and found out for yourself whether it was a contender or a ringer. You were encouraged to send Headlands Press 25 bucks if you liked it. If not, you could pass the disk on or copy it for a rematch with somebody else.

PC-Talk drew quite a few users and quite a few bucks. Users described its attraction succinctly: "It's cheap [or, among the less scrupulous, free], it works, and it does everything I need."

Now *PC-Talk III* is being offered under the Freeware program. The current suggested contribution is 35 simoleons, which is still cheap. *PC-Talk III* does virtually everything its predecessors did. But it also has some swift new moves that make it a tougher competitor than ever.

PC-TALK WORKED with just about any modem around.

New Muscles

The old versions of *PC-Talk* ran from interpreted BASIC and fit into 64K of memory. With *PC-Talk III* you get two editions: a 64K version much like the old one, and a compiled high-performance model that needs 128K of memory. The program will run from PC-DOS 2.0, but extra memory will be needed, at least for the interpreted version.

Both models operate at speeds up to 1200 baud, but certain things happen faster in the compiled edition. The old version's "fast" mode, which caused some annoying screen handling, has been totally eliminated from both new editions. Users tooling along in the 1200-baud fast lane will notice a definite improvement.

There's more that's new. Alt-C now clears the screen. Alt-W gives you a sort of "typewriter" feature—a beep that warns you when the width of a typed-in line has exceeded a preset limit. The Alt-D dialing directory has been expanded to make room for 60 entries. Alt-Q will make a Hayes Smartmodem redial a busy phone automatically until it establishes a connection. And Ctrl-End will send out something called a "sustained break"—a non-ASCII signal (not to be confused with Ctrl-C or anything else) that some systems want to see. But that, as they say, is just Round One.

Keys to Success

The ten function keys are now available in all four of their modes—unshifted, upshifted, Ctrl, and Alt. Each of these 40 keys may be assigned a string of up to 126 characters that's saved in a disk file so it doesn't disappear between sessions. The first 30 characters of each string are displayed in a directory that appears when you type Alt-K; at this point you can modify or cancel any of the current assignments. It's an extremely handy feature for log-on sequences and the like.

You also get ten keys (Alt-0 through Alt-9) to which you can assign temporary strings of up to 50 characters each. These can't be stored: you reassign them each time you use the program. The first seven characters assigned to each string are displayed on the bottom line of the screen in familiar BASIC format.

(Memo to *ProKey* users: it would probably be wise to quit that program before entering this one. *ProKey*'s priority over the various Alt-shifted and function keys could cause problems. Besides, *PC-Talk III* uses Alt-= to reassign the Alt-numeric keys, and this important *ProKey* command could cause more confusion.)

Old *PC-Talk* hands will recognize that the roles of the function keys and Alt-numeric keys have been switched around from previous versions. A couple of neat things from older versions have been eliminated. *PC-Talk III* no longer has special keys for dialing The Source and CompuServe, nor does it assign special functions to the End, Ins, and Del keys when using these services. With all the extra function keys available now, it's hard to complain. I suspect someone who desperately wanted to keep the old key assignments could do a little playing with the BASIC source code. The interpreted version is still listable. In fact, the program comes with a separate ASCII file of remarks that you can merge into it if you're serious about fiddling around.

The PC-Talk III Files

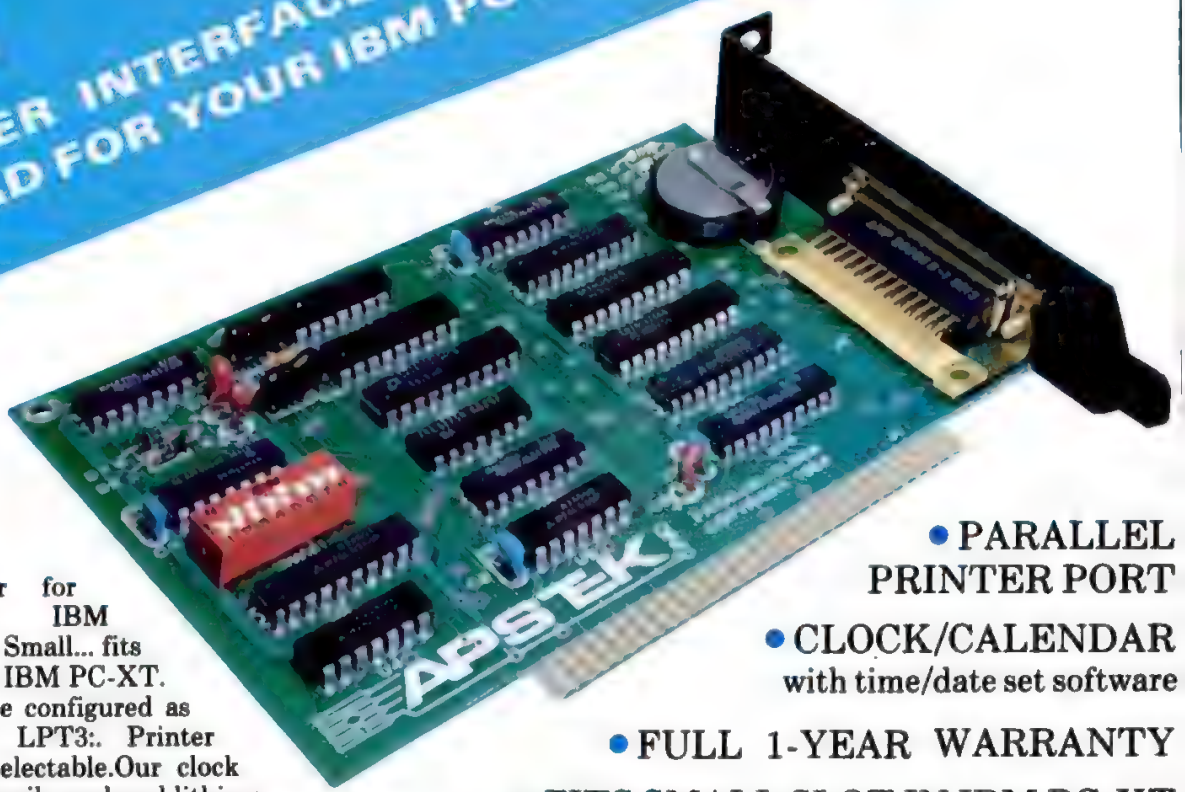
The big news with *PC-Talk III* is its file handling. Say you're noodling along on CompuServe's CB simulator and some incredible *mot juste* appears on the screen—a comment so pithy you just have to save it for posterity. Quickly hit Alt-S, and you will dump the contents of the screen to a special file called SCRNDUMP.PCT. Every time you do this, you will append the latest screenful of information to that file—a very slick move indeed for those occasions when something else important turns up on the screen and you're caught with your disk drives down.

OLD PC-TALK hands will recognize that the roles of the function keys and Alt-numeric keys have been switched around from previous versions.

Other new stuff has been added to the file handling process. the PgUp and PgDn keys, logically enough, will now upload and download files—but if you don't like

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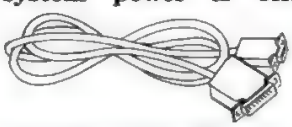
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that terminology, you can still Transmit and Receive with Alt-T and Alt-R. Alt-V still lets you view a file on the logged disk one screen at a time, paging through it with the space bar. And Alt-Y still lets you delete a file from disk. You can get a directory at any time by pressing the ? key when prompted for a file name. Following the ? with a file name (or specification using * and ? wildcards) will give you a partial directory.

A pacing option is available for transmitting and receiving files. It may be needed for some mainframe systems—the documentation claims that *PC-Talk III* is now too fast for some remote systems. The pacing option, invoked by typing =p and a number (which may be a decimal fraction) after the filename, will cause a time delay of the indicated number of seconds after transmitting each line.

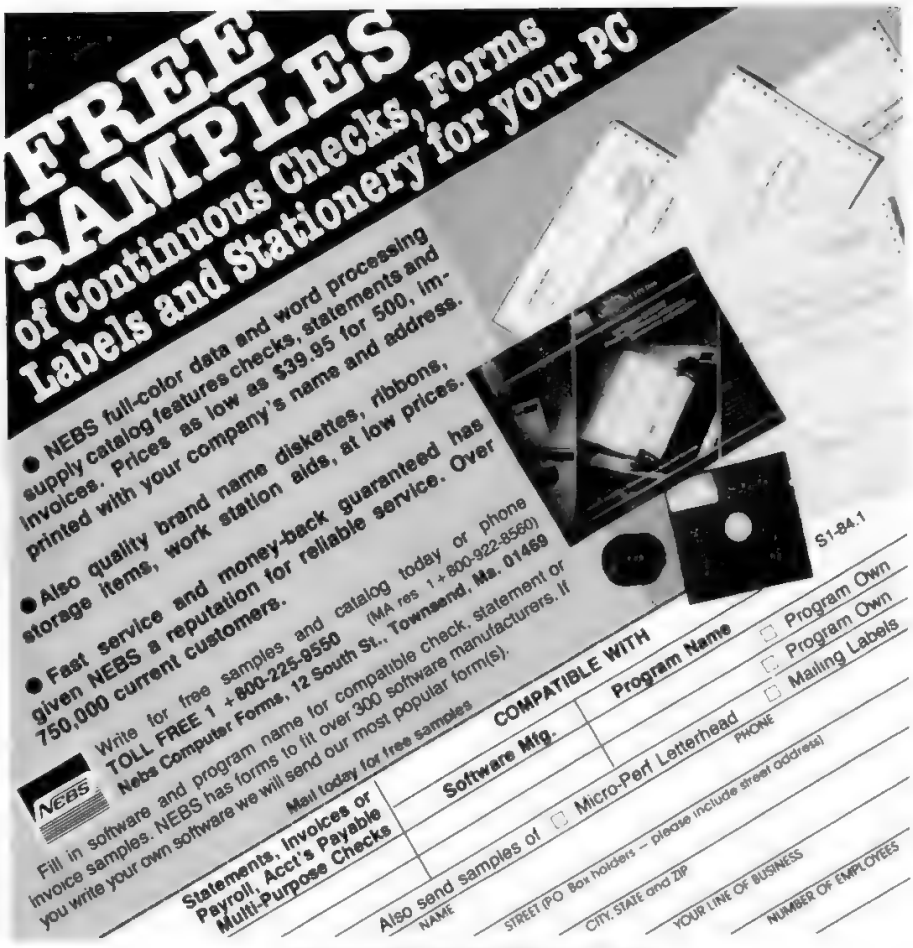
Typing a non-numeric character or characters after the =p will make the program wait for that character or characters as a prompt from the remote computer (instead of waiting a specified interval) before sending the next line. The pacing option automatically changes each carriage return/line feed sequence to a space/carriage return that is often required by mainframe systems in this mode.

Binary mode is also new. When transmitting with an 8-bit protocol, you can type =b after the filename, and a binary file will be sent without printing characters to the screen. As far as I'm concerned, this option might as well be called "Russian roulette," since no error checking is performed and a one-bit error could make mincemeat of any program file.

THE XMODEM error-checking protocol does make errors exceptionally unlikely.

Make No Mistake

Fortunately, the binary mode is made virtually superfluous by a new option: the XMODEM error-checking protocol originally developed by Ward Christensen for



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CP/M users. To use the XMODEM option, both the sender and the receiver must type =x after entering the name of the file being transmitted.

The file is then sent automatically, one 128-byte "block" at a time. The block includes some special characters, including a "checksum" representing the sum of the ASCII values of the characters in the block. Only when the remote computer determines that everything is in order does it send out for the next block of data. If something is wrong, the remote machine asks the sending machine to send the data again.

This particular protocol is in rather wide use in the CP/M world. It doesn't entirely guarantee that there will be no errors in a transmission, but it does make errors exceptionally unlikely. It's therefore an excellent way to transmit program files or other files in which accuracy is of the utmost importance. This option is a real attraction, especially when communicating at 1200 baud over telephone lines of less-than-ideal quality. One caution: A file sent in this manner is likely to end up with NUL characters filling out the final block. This shouldn't affect a program file's operation, but if you run the PC-DOS COMP program on the original and the copy, you'll get a "Files Are Different Sizes" message.

Stripping Down

Perhaps the neatest new feature in *PC-Talk III* is character stripping and conversion. Until now, I've been baffled and frustrated at receiving 20,000-character files of which I've been able to read only the first 3,400 characters. I guessed that somehow an end of files (EOF) character got stuck in there because of a transmission glitch. Now I discover from the *PC-Talk III* manual that certain remote services (including The Source) deliberately include such characters in their transmissions.

PC-TALK III no longer has special keys for dialing The Source and CompuServe.

At your behest, *PC-Talk III* will change any incoming ASCII character to any other—or strip it out completely. You can do up to three characters at a time. And you can specify separate stripping options (carriage return to space, backslash to slash, whatever) for each of the 60 phone numbers and individualized parameters in the dialing directory. EOF characters, you have met your doom.

You can set up stripping as a default, too. In fact, it's now possible to change various program defaults right from the keyboard while you're running the pro-

Figure 1: The PC-Talk III default screen, called up by pressing Alt-F.

```
---SET NEW DEFAULTS---

 Present program defaults.

Baud rate        300          Screendump file  B:SCRNDUMP.PCT
Parity           E            Redial delay     20
Data bits        7            Connect prompt   CONNECT
Stop bits        1            Line 25 help     Y
Echo             N            Foreground       7
Messages         N            Background       0
Strip #1         0            High inten       15
Replace #1       0            Print port       LPT1
Strip #2         0            Print init       ''
Replace #2       0            Print width      80
Strip #3         0            Comm. port       COM1
Replace #3       0            Comm. init       ,CS,DS
Pacing p=        ''           Modem init       ''
Logged drive     B:           C/R subst        )
Margin width     70
```

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gram. Alt-F calls up a screen listing the current parameters (Figure 1). You may change any of them and retain the new settings either for the current session or permanently on disk.

THE documentation claims that PC-Talk III is now too fast for some remote systems.

Among the things you can change are the colors of the foreground, background, and high intensity displays—a boon for users with color monitors.

Slightly Defaulty

The defaults section of the version I received contains the only (and rather minor) program bugs I've managed to find in *PC-Talk III*. If you alter any of the defaults and then change your mind, you can supposedly exit without making any changes. But if you do, and then return to the defaults screen, it will display the changed parameters—which in fact have not really been changed at all. If you happen to enter an incorrect value and save it, the program will tell you so—but despite the prompt, "Try again," you won't be able to do anything except use Ctrl-Break to exit completely.

Considering that *PC-Talk III* can even recreate its own default file—all you do is delete the old one before running the program—I don't consider these problems major. But when I called them to Andrew Fluegelman's attention, he came up with the fixes in a matter of hours and said they'd be incorporated in all new versions.

The way to find out what version you've got is to run the program, hold down a shift key, and hit the Tab key. A number should appear on the screen. If it's 0830326, you've got the one with the bugs. You can either live with them by being careful about the way you change defaults, get a later version from someone else, or make the modifications listed in Figure 2.

Figure 2: A procedure for correcting the defaults section of PC-Talk III.

1. Make a backup copy of the program disk in case you make an error when performing these modifications. If you know absolutely nothing about BASIC, it might be a good idea to get someone to help you with the rest of the procedure.

2. Type talk64 to load BASIC and the program PC-TALK.BAS.

3. Hit the Ctrl and Break keys simultaneously. This should abort the program and take you back to BASIC. When this is done, you will see BASIC's "Ok" prompt.

4. Hit Ctrl-Home to clear the screen.

5. Change lines 210, 5260, 9035 and 9999 to read as follows:

```
210 DFNUM=29:DIM DP$(29):DIM D$(29):DIM DT$(29)
5260 GOSUB 2500:IF Q$=CHR$(27)THENGOSUB2655:GOSUB
     2655:ABORT=-1ELSEIFQ$<>""THEN DT$(I)=Q$:IF
     DT$(I)=" " THEN DT$(I)=""
9035 IF ERL=5280 THEN BEEP:GOSUB 5295:PRINT TAB (32)"***Invalid
     communications parameters. Try again.";:EXIT=Q:RESUME 5215
9999 DATA 830424
```

(The easiest way to make the changes is to LIST each line, correct it, and hit the Enter key while the cursor is still on the line.)

6. Add new lines 5231 and 5271 as follows:

```
5231 FOR I=1 TO DFNUM: DT$(I)=D$(I): NEXT
5271 FOR I=1 TO DFNUM: D$(I)=DT$(I): NEXT
```

7. Type: SAVE "PC-TALK.BAS", then press Enter Key.
8. Type SYSTEM, then press the Enter key to exit to PC-DOS.

Your corrected interpreter version of *PC-Talk III* is now on the disk. To compile it with the BASIC compiler, follow the instructions in the *PC-TALK III* documentation.

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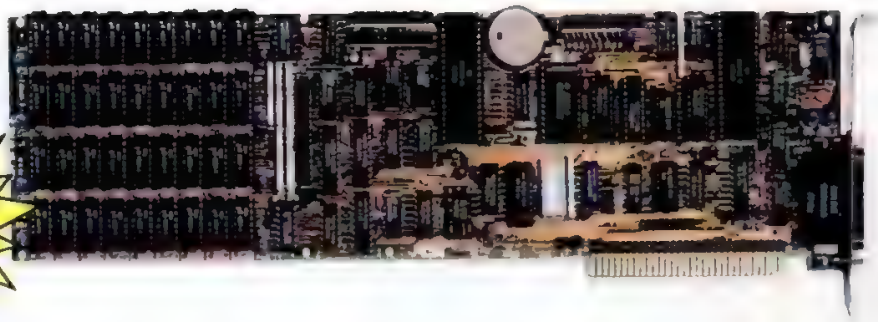
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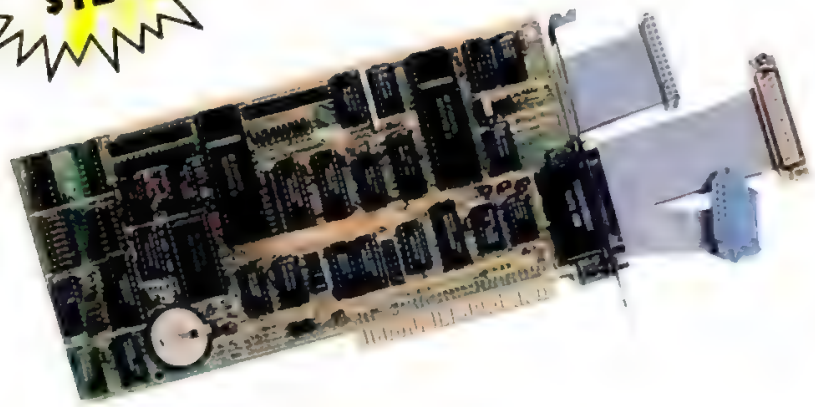


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They're easy to do for the intepreter-BASIC version, but if you want to incorporate them into the compiled model, you'll need the BASIC compiler.

Which brings me to a few comments about Freeware's update policy. It's simple: Fluegelman says he'll send notices of updates to all users who have sent him the suggested contribution, and he'll update a contributor's disk free of charge if it's sent to him with a postpaid mailer. Talk about user-friendly! Major software houses, are you listening?

Read All About It

I'm usually pretty hard on documentation, but the 70 pages you get here are better than most. How nice they look, of course, will depend on your printer—the manual is supplied on the program disk. Take the on-screen printing instructions seriously: The process does not seem to use form feeds and, since the documentation has lines near the top and bottom of the page, it's important to set the top of form correctly.

I didn't find any major errors or inconsistencies in the documentation, but a novice user may be pardoned some degree of confusion. Even though it's chock full of interesting tidbits, the manual is not a primer on communications. If you start out with absolutely no idea of what you're doing, you may run into problems. Occasionally, choice morsels are tucked away where you might not expect to find them. And more examples would have helped,

THE DEFAULTS section contains the only program bugs I've managed to find in PC-Talk III.

particularly in the section on parameters. I'm still not entirely certain how one might use the "Comm Init." and "Modem Init." parameters. I have a vague idea, but the manual doesn't really give me a clue.

The table of contents is well organized, and so is the summary of all the available commands, but an index, missing here, should be standard in any documentation—especially in the kind of manual you have to reach for and use almost instantly before the guy at the other end of

AN INDEX should be standard in any documentation—especially in the kind of manual you have to use before the guy at the other end of the line hangs up on you.

the line hangs up on you. A troubleshooting guide would also have been useful. And so would a table of error messages, particularly for the XMODEM protocol, which can give you some surprises. It's also somewhat unclear when the default parameters are in effect and when they're overridden. In any case, go ahead and start up the program and use the manual in conjunction with it—but be sure to read the documentation cover to cover.

Weak Spots

Quibbles? A few. The old version knew whether your modem was on and refused to perform if it was off. *PC-Talk III* can't tell whether your machine is on or off without some sort of modification that the documentation does not tell you how to make.

If the modem is off, the program can "hang" temporarily without giving you a clue why. Pretending to exit the program with Alt-X and then responding negatively at the next prompt seems to solve the problem without crashing the program—something, incidentally, that I couldn't do except by hitting Ctrl-Break, and sometimes not even then.

PC-Talk III uses line 25 as a status line for all sorts of things: Alt-key assignments, the name of the file you're currently downloading, a brief summary of the most important commands. Sometimes the sta-

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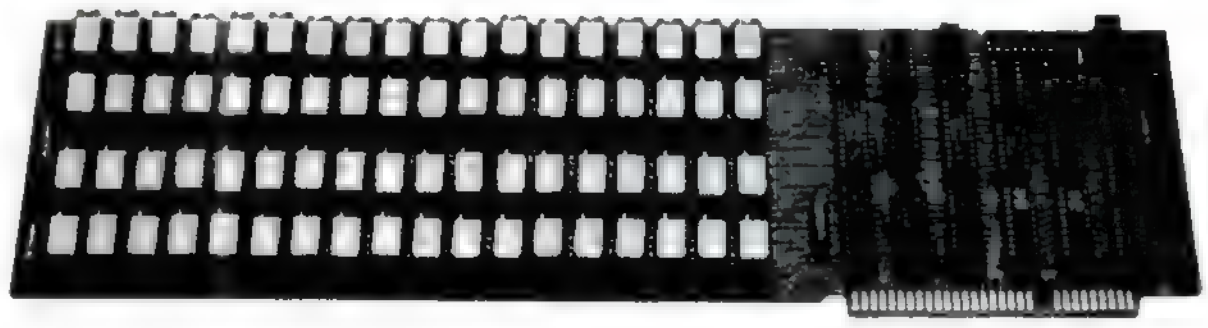
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tus line seems to change without changing back to what you might expect. At one point the status line forgot to remind me that I was still downloading a file after I went through a couple of other functions. That might have caused problems later on.

Perhaps the most annoying omission in *PC-Talk III* is that it doesn't have a dedicated command to tell your modem to hang up. When you log off some of the more common services, some data networks stay on the line to let you log in again. It's annoying to have to switch the modem on and off just to terminate the call. Assigning an easily accessible function key (two if necessary) to your modem's hang-up command will do the trick and save you no end of irritation.

Go For It!

There are plenty of ways to get a copy of *PC-Talk III*. The easiest is to find somebody else who's got one and run off a copy. The second is to send $35 to the Headlands Press at the above address. The third is to send a formatted disk to the same address along with a postpaid mailer. Headlands will put the program on your disk and send it back to you.

One caution: Each version of *PC-Talk III*—interpreted and compiled—fits on a single-sided disk, but single-sided disks are too small to hold both versions. Headlands would prefer that you send one disk in the double-sided format, but if you only have single-sided drives, send two single-sided formatted disks.

Freeware is an idea that seems to work. Fluegelman doesn't know how many copies are out there, but he figures he gets contributions from about two-thirds of the

SMARTCOM II
is designed to be used with an IBM PC and a Smartmodem.

people who've gotten the program from him, and around 10 percent of the rest. Other authors have followed the lead and are offering programs under the same sort of arrangement. When they're good—and

some of them are very good indeed—they're the biggest bargains in the PC universe.

PC-Talk III stays in the ring as a tougher contender than ever. It's easy to use, it works, and you can try it for free. But even if you pay for it (and if you use it, you certainly should), I suspect you'll consider it a real steal.

Hayes Smartcom II
Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791
List Price: $119
Requires: 96K, PC-DOS, one disk drive, asynchronous communications adapter, Hayes Smartmodem.

There's not much question about which modem is the current champ. The Hayes Smartmodem has become such a de facto standard in microcomputer communications in both its 300 and 1200 baud versions that many of the other modem makers now proclaim Smartmodem-compatibility. When it first came out, the Smartmodem 1200 seemed to be back-ordered till eternity; as of this writing, Hayes says it's down to almost no delay in shipments. And now there's a board version to stick into the backplane of your PC. I would not mind being Mr. Hayes.

Smartcom II from Hayes is what we might call "dedicated software." It's designed to be used with an IBM PC and a Smartmodem. If you buy the board Smartmodem, Hayes throws in *Smartcom II* as part of the deal. Whether "Smartmodem-compatibles" will work with this program is one of those difficult questions best answered—preferably in writing—by your dealer.

Smartcom II needs 96K RAM and PC-DOS 1.0 or 1.1 to run on the PC. Hayes says the program will run from PC-DOS 2.0, too, but that requires 128K RAM. The program can use up to 192K, at which point it becomes entirely resident in memory and no longer needs to import modules from the disk. The program is not copy-protected, and Hayes sensibly recommends that you make backup copies.

In terms of ability, *Smartcom II* is a heavy hitter indeed. It'll do just about everything *PC-Talk III* will do and then some. It can send and receive files in just

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Figure 3: The top of Smartcom II's Main Menu screen, listing potential options, a help line, and a directory of the currently selected disk.

```
1. Begin Communication   *. Receive File          7. Change Printer Status(OFF)
2. Edit Set              *. Send File             *. Select Remote Access
3. Select File Command   6. Change Configuration  9. Display Disk Directory(OFF)
A,B - Change Drive                                0. End Communication/Program
                         Press F2 for Help
Enter Selection: 1

                    Dials or answers phone with Samrtmodem
Directory of Disk A:
```

about every imaginable way. It'll let you store and receive special communications parameters for 25 different communications sources and let you tailor 25 special macro-instructions for each source. It'll strip undesirable incoming characters such as the notorious EOF. It will allow you to take command of a remote computer's files or let your phone be controlled by a computer at the other end of the telephone line. It gives you a mind-boggling range of user-modifiable parameters. It even offers a rudimentary line editor for preparing files. Its communication screens are gorgeous, and rewrites are exceptionally fast. And the program will address just about every feature that a Smartmodem is capable of.

IN REGARDS TO the user, Smartcom II is slow o i its feet.

The Menu Kid

There's just one problem: In regard to the user, *Smartcom II* is slow on its feet. The program is menu-oriented to a fare-thee-well, and there's no way to escape it. When you want to do something, you are almost always forced to look at the screenful of options and messages—even when you know exactly what it is you want to do. *Smartcom II* thinks it's real smart, but it seems to consider you a pea brain.

When you start the program—and many times thereafter—you are treated to the main menu. It uses three columns at the top of the screen to list ten potential options—some are usually unavailable and are represented by asterisks instead of numbers (see Figure 3). The currently selected option is highlighted on the screen. Below that is a line of help, offering a more extended description of the currently selected option. And below that is a directory of the currently selected disk.

You're also given three status lines at the bottom of the screen. The top one displays information on the status of the modem and, when applicable, the printer and currently accessed disk file. Depending on the situation, the middle line shows messages or function key assignments. The bottom line keeps you current on the system time and date and the status of the Num Lock and Caps Lock keys.

How Smart Is Smart?

One of the few defaults you can't modify, and one of the most annoying, is the way the program forces you to begin with A: as the working disk drive. Almost certainly the first thing you will have to do is change it to something else. If by chance there is no disk in the drive you pick, the drive will spin merrily until the program decides, incorrectly, that drive B: is in fact available. You won't get an error message from PC-DOS or from the program until you try to do something with the drive, at which time you may get a File Error message. *Smartcom II* isn't smart enough to recognize there's no disk in the drive.

To select the highlighted option, you can simply hit the Enter key. To choose a different one, you can press its number. Or you can move the highlighting through the menu by using the left and right arrow keys. Those keys, oddly enough, move you up and down through the columns—just the first of many slick counterintuitive punches *Smartcom II* has in store.

What a Set!

The first choice you're likely to make is option 2—"Edit Set." This inaptly-named function lets you into the world of what Hayes calls "Communication Sets." A Communication Set is a cluster of parameters and macro-instructions that the user can customize for a particular application. If this doesn't sound any too clear, bear with me. The crack manual writers at Hayes never came up with an adequate definition of Communication Sets themselves.

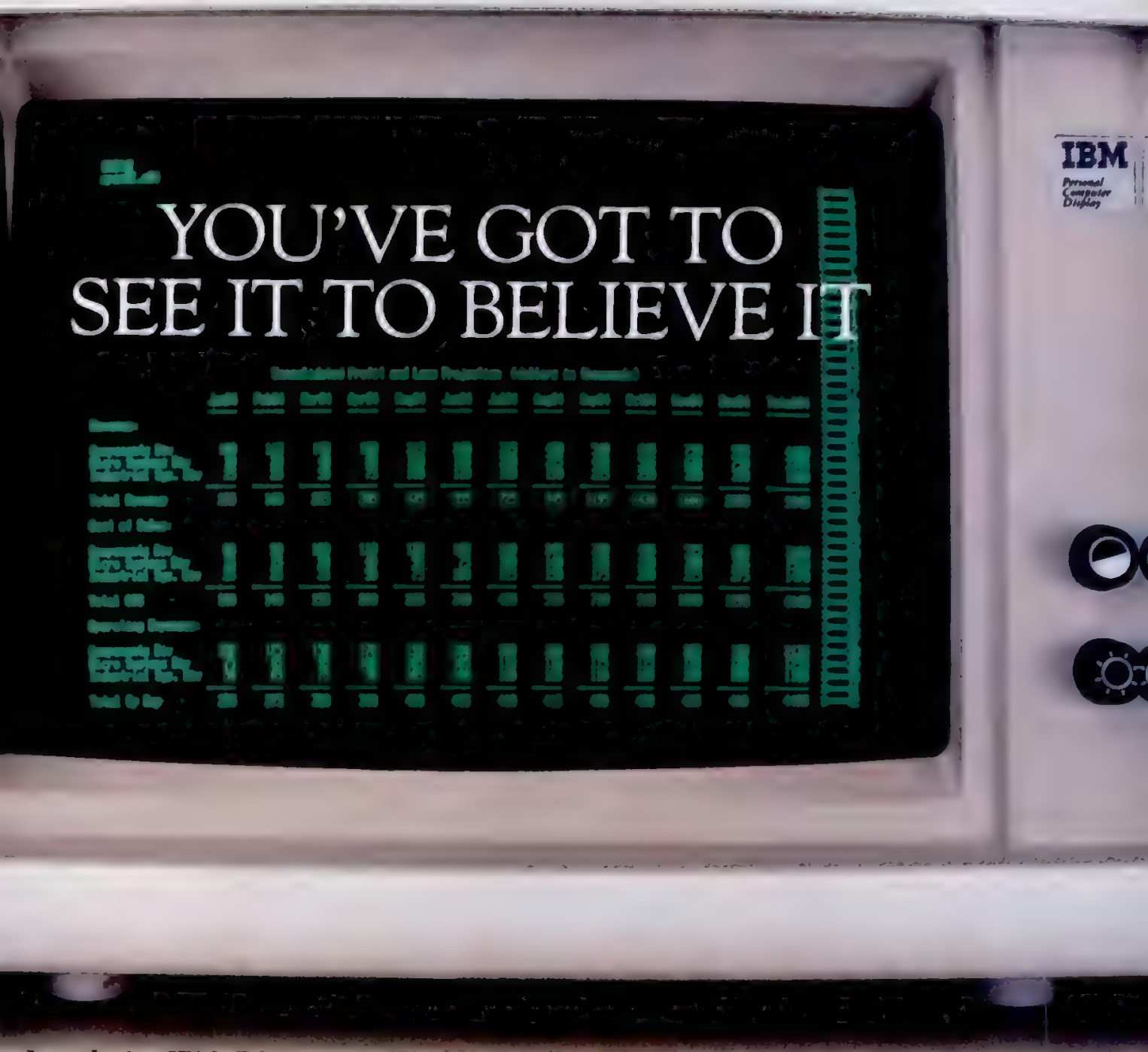
Choosing "Edit Set" replaces the directory of disk files with a three-column diretory of the 26 available Communication Sets, each preceded by a letter identifying it. You also get a new five-course minimenu. You'll generally go to "Select Set," which lets you change the current Communication Set—say from the one for CompuServe to the one for The Source—by typing a letter. Or you can change the current choice by moving the highlighting up and down through the directory—again by using the left and right arrow keys.

Sparring with Parameters

Once you select a Set, you can view the Parameters screen by choosing the P option. It will look like Figure 4.

SMARTCOM II thinks it's real smart, but it seems to consider you a peabrain.

Modifying these parameters is another less-than-logical process. Your friendly left and right arrow keys no longer take you through the options. To do this, you use either the down arrow or Enter key to move down and the up arrow key to go up.



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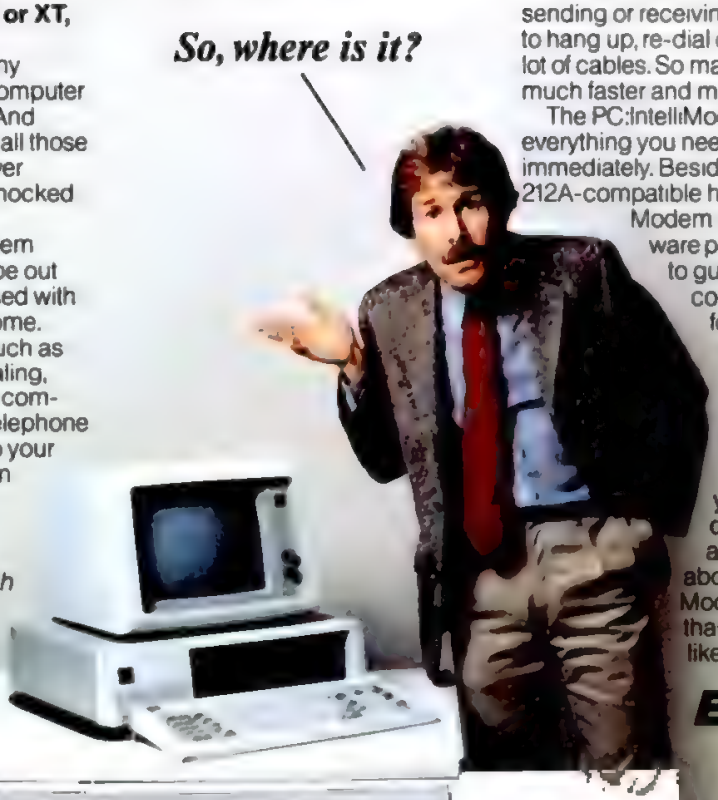
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CIRCLE 171 ON READER SERVICE CARD

Figure 4: This Parameters screen in Smartcom II shows the conditions for the Communications Set used with the CompuServe Network.

```
                              PARAMETERS
  Name of Set: C - CompuServe Network

        TRANSMISSION PARAMETERS                  KEYBOARD DEFINITIONS
              Duplex   FULL                      Escape Key  128 (F1)
                Baud   300                        Help Key  129 (F2)
Character Processing   FORMATTED                Printer Key  130 (F3)
  Show Control Codes   NO                       Capture Key  131 (F4)
           Page Pause   NO                    Macro Prefix Key  132 (F5)
   Show Status Lines   YES                       Break Key  133 (F6)
        Confidential   NO                     Break Length   35 (0.01 sec.)
  Include Line Feeds   NO
     Character Delay     0 (0.001 sec.)            PROTOCOL PARAMETERS
           Line Delay     0 (0.01 sec.)        Receive Time-out   60
    Character Format   7 DATA + EVEN + 1 STOP    Send Time-out   10
                                          Stop/Start- Stop Char   19 (DC3)
                                                      Start Char   17 (DC1)
         TELEPHONE PARAMETERS             Send Lines- EOL Char   10 (LF)
      Answer On Ring     1                        Prompt Char   32 (" ")
       Remote Access   NO        Password
        Phone Number   758-4114
```

Well, sort of. If you hold down the Enter key, the cursor will first move most of the way down the first column, to the end of "Transmission Parameters." Then you find yourself at the top of the second column for "Keyboard Definitions" and "Protocol Parameters." When you get to the bottom of that, you'll get back near the bottom of the first column to work on "Telephone Parameters." Smart?

Let's try our old pals, the left and right arrow keys. Surprise! They now change the parameters! If there are only two options (Full or Half for Duplex, say), pressing either the left or right arrow key will change the parameter and a second press will restore it. For options that allow more variation (character delay, for example), the right arrow key will increment the number, and the left arrow will decrement it. You also have the option of entering a change directly from the keyboard. The program won't accept invalid values. But it will stupidly let you assign two special functions to the same key; when I did this by accident, only one of the functions actually worked.

The phone number area gives you 38 characters and allows you to include Smartmodem commands such as those for tone and pulse dialing, and to pause for a second dial tone. To change free-form data such as the phone number or the name of a Communication Set, you have to press the backspace or left arrow key to delete the current entry before you can enter a different one.

A couple of the Transmission Parameters are particularly useful. Selecting Formatted under Character Processing removes control and other undesirable characters from incoming data, whereas the Direct mode will leave them in. The Confidential mode will let you suppress the

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display during file transfer. Page Pause will stop writing the screen when it's full and wait for you to hit a key before going further. Data still comes into the buffer, though. It's a nice way to keep incoming data from scrolling off the screen before you have a chance to read it.

When you get down to the bottom of the screen, you can save your parameters to disk or simply hang on to them for the session. But if you realize you've made a goof, there's no way (short of telling the program not to save the changes to disk, and then exiting the program) to leave the screen and restore all the original parameters.

THE LEFT AND right arrow keys, oddly enough, move up and down through the columns.

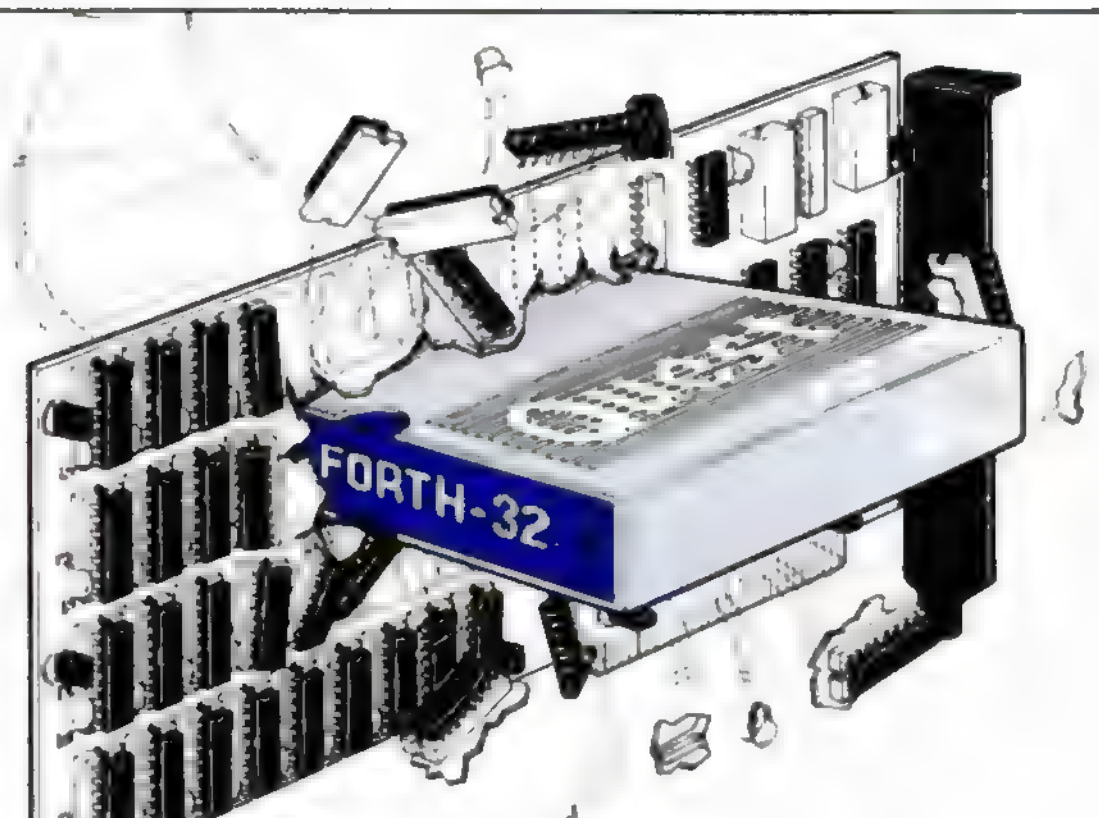
Big Macros

After you select a Communication Set, choosing the M command gives you a directory of the 26 letter-labeled macros available for that set. Pressing a letter lets you see the contents of the macro you've selected.

"What the hell is a macro?" shouts a skeptical nontechnical voice from the crowd. Good question. A macro (short for macro-instruction) is a sequence of instructions you can store on a disk or save only for the current session, and send to a remote computer. With *Smartcom II*, the macro Z is always reserved for "Automatic Log-On"—the series of responses the program gives a remote machine when it first acknowledges your computer's existence. Once you're on-line, the other macros can be called up by hitting the Macro Prefix Key (one that you have previously defined) and the letter that identifies the macro.

The Macro Definition screens (Figure 5) let you insert up to 16 lines of data, all of which will be sent with a single keystroke. Each data line can be up to 48 characters long, and you can instruct *Smartcom II* to delay sending each line until it gets a specific prompt from the remote computer or it has waited a specified amount of time. A different prompt may be given for each line.

Since the remote computers I access only accept information one line at a time when they prompt me for it, I can't say I've ever encountered a situation where this feature would really come in any handier than *PC-Talk*'s ability to send long strings with carriage returns in them. But given the depth and breadth of the communications world, I suspect this responding-to-prompts feature of *Smartcom II* must be highly useful to somebody.



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Figure 5: A Smartcom II Macro Definition screen.

```
                              MACRO DEFINITION
Name Of Macro: A - Atlanta Weather          Set: C - CompuServe Network
Time-out  Prompt     Data                                          Send CR
--------  ---------  --------------------------------------------  -------
    0       0 (off)  GO CIS-1                                        YES
   10      33 ("!")  1                                               YES
   10      33 ("!")  1                                               YES
   10      33 ("!")  5                                               YES
   30      32 (" ")  2                                               YES
   30      32 (" ")  ATL                                             YES
```


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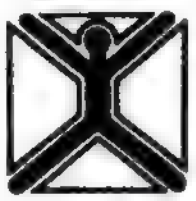


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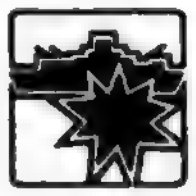


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CIRCLE 108 ON READER SERVICE CARD

The manual explains a helpful strategy for developing macros by using your printer to document the commands sent between your computer and the remote machine. Unfortunately, information on actually preparing the Macro Screens is rather sketchy. The data entry method turns out to be the same one you use on the Parameters screens. But it's still not entirely clear, for example, when you should turn the Prompt setting "off" and when you should set it to be a space.

Hayes has included macros for accessing some much-used features of such popular services as The Source, CompuServe, and the Dow Jones News/Retrieval Service. Studying these pre-installed sets is probably the very best way of finding out how macros really work. Once you get the hang of it, it won't be much trouble to develop a macro that will whiz you through CompuServe, send you directly to the CB emulator, swiftly type out your handle, and leave you ready to bore dozens of people throughout our great nation.

Special Moves

There are a couple of other things you can do from the Edit Set option. One is copy an entire Communications Set to another. You can't copy selectively—every parameter and macro has to go into the new set—but it's useful if you've developed a lot of macros for a remote system you access at two different baud rates or through two different phone networks.

You can also print out reports for any set you choose, either a detailed report listing all parameters and macros for a given set or a summary listing the macro directory for every defined Communication Set.

Getting on line is fairly straightforward. From the main menu you simply choose the "Originate" option, select a Communication Set, and let *Smartcom II* perform the dialing and log-on operations. To do these manually, you have to use a Communication Set that lacks a telephone number and has a blank automatic-log-on macro.

The manual explains how you can use a Y-connector to hook up your telephone and modem so that you can communicate orally and then connect both your computers without redialing. Unfortunately, this requires some sneaky ways of getting

around *Smartcom II*'s automatic dialing features. This method turns out to be significantly more complicated than doing the same thing with *PC-Talk* by addressing commands directly to the modem—something that's difficult to do with *Smartcom II*.

YOU CAN HOOK up your telephone and modem so that you can talk to someone orally and then connect both your computers without redialing.

Once on line, you communicate with the remote computer from your keyboard. Unless you've reassigned them, function keys F1 through F6 take over the duties indicated in the middle status line. F5, the Macro Prefix Key, tells the machine that the next letter key you press is really a macro command. F6 sends a sustained break of stop bits and F3 routes incoming data to the printer.

F4 is the Capture key. Pressing it records data to a disk file called TEMP. Pressing it again suspends data capture. A third press lets you append data to that file. And so on. Pressing F1 ends that particular mode of downloading. At that point you have to supply a new filename for the TEMP file before proceeding.

There's also something called a display buffer. This lets you look at already-received data at your leisure while more data is coming in. The Home key shows you the first screenful of text in the display buffer—usually the beginning of the session. PgDn and PgUp move you forward and back 16 lines in the text; the up and down arrows scroll text a line at a time. The End key takes you back to a display of currently incoming data. This feature is definitely a plus when you want to see what you typed in 10 minutes ago.

When you're on line, pressing F1 sends you back to the menu screens—to check your macro directory, for example, or to check your disk files. Your current screen of text disappears until you go back. This is a real nuisance and can be especially galling when you want to send or receive a file, but there's no way around it. Worse, if you're receiving a disk file with the Capture key, you can't get back to the main menu unless you first close and rename the file.

You can send and receive files with any of three protocols: Start/Stop, Send Lines, and Verification. The Start/Stop protocol is the one you're most likely to use for standard text files; Send Lines is much like *PC-Talk III*'s pacing option. Verification is a special Hayes protocol that will work with other Hayes software packages and very little else. It sends data

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SMARTERM

in blocks in much the same way as the XMODEM protocol, but the two are, emphatically, not compatible.

Taking Command

Probably the jazziest feature of *Smartcom II* is its ability, when transferring files, to "take over" another computer if it uses the same software. This is a bit complicated, but it does work. Both machines must be using *Smartcom II*, and the remote user has to set parameters that will allow his machine to be accessed via remote control. Not just anybody can get at the remote computer; it's protected by a password. The controlling computer can get a directory of any disk drive on the remote system. The manual kindly points out that the remote system may crash if asked for a drive that doesn't exist or doesn't contain a disk.

Once you've gained access to the remote system, you can upload and download files to and from it, read its disk directories, and even rename and erase any files on its disk drives. This could be extremely nice for an office that wanted to exchange communications after hours. But there's no way to allow partial access to the remote computer; you can't for example, disable a caller's ability to delete files. It's either all or nothing.

A DISPLAY buffer lets you look at already-received data at your leisure while more data is coming in.

A Few Quick Notes

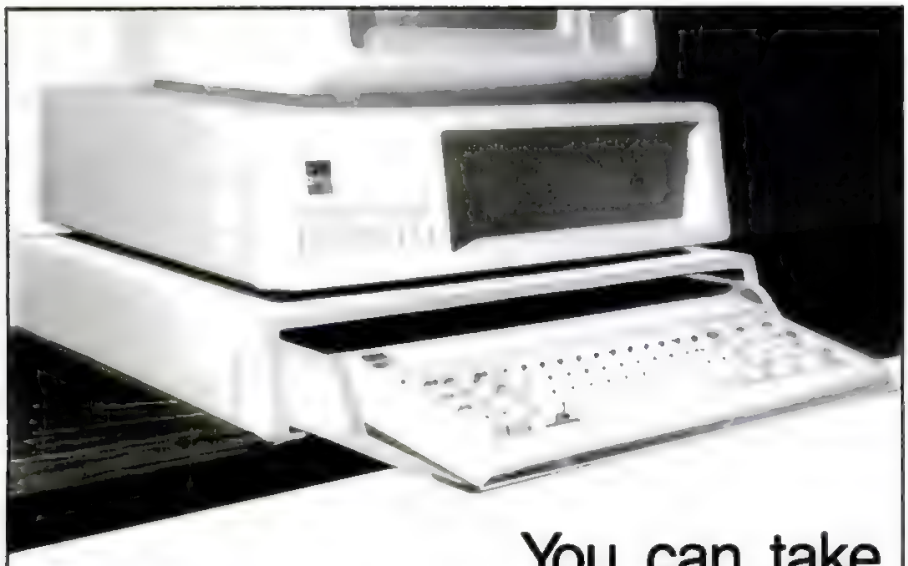
An option called Create, accessed from the main menu, gives you a rudimentary text editor that lets you view and print files as well as type new ones in. You can append more data to a file already in existence, but you can't view the original portion of the file while you're actually working with the editor. The Create mode might be handy for dashing off quick notes without exiting the program to call up a word processor, but considering that you can only correct data a line at a time—and then only by backspacing—it's not terribly worthwhile for much else.

A screen called Configuration lets you change such basic system parameters as the printer configuration and the communications port, as well as more arcane items like the pause between dial tones.

Literary Offenses

The manual is standard IBM height, though the box is thin cardboard and the ring binder is silver plastic. It has very readable type, attractive line drawings, and color-coded tab separators.

Unfortunately, its beauty is only skin



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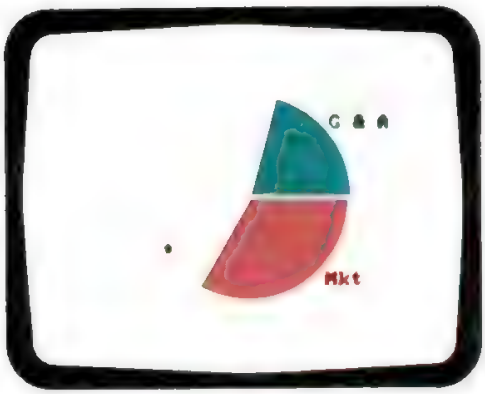
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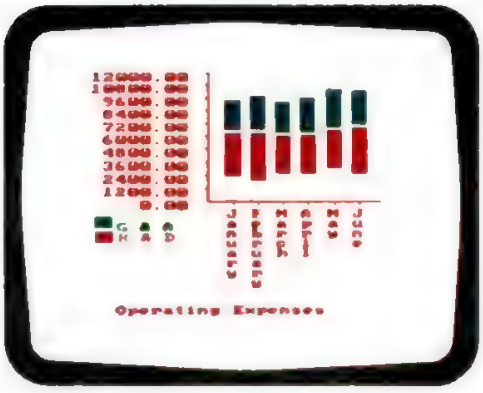
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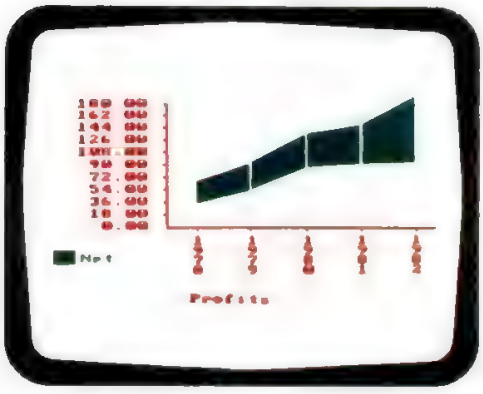
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CIRCLE 275 ON READER SERVICE CARD

Good News for VisiCalc® Users







Required hardware: IBM P.C. with 128K RAM (DOS Version 1.1) or with 192K RAM (DOS Version 2.00) and at least one 5-1/4" diskette drive. For screen graphics: IBM Color/Graphics Adapter and compatible color or monochrome display. For printer graphics: IBM or Epson printer with GRAFTRAX option and IBM Color/Graphics Adapter. **Required software:** IBM DOS, Version 1.1 or Version 2.00; VisiCorp VisiCalc, Extended Memory ("256K" or "512K") Versions, or IBM VisiCalc, Version 1.10 or greater.

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In just a few keystrokes, transform the columns of figures from your VisiCalc spreadsheet into a pie chart or any of 7 other types of charts and graphs. Without ever leaving VisiCalc!

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StretchCalc is a trademark of Multisoft Corp., IBM is a trademark of International Business Machines Corporation, VisiCalc is a VisiCorp trademark, GRAFTRAX is a trademark of Epson America, Inc.

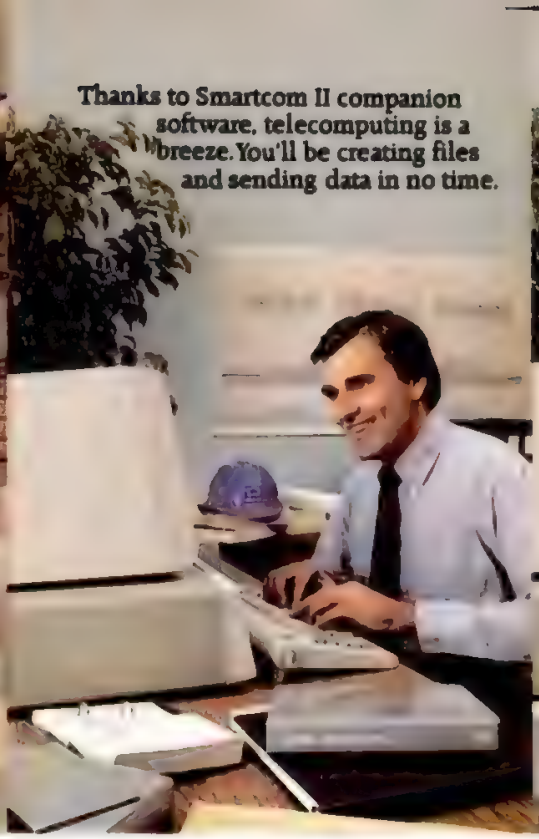
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CIRCLE 337 ON READER SERVICE CARD



One-stop communications. One-step installation. Smartmodem 1200B and Smartcom II software are available now.



Thanks to Smartcom II companion software, telecomputing is a breeze. You'll be creating files and sending data in no time.



Need important information from the main office...today? Get it quickly, efficiently, accurately. From their computer to yours.

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Hayes is still leading the way with new telecomputing products. And now combining every bit of sophisticated technology into one communications package for your IBM* PC. Smartmodem 1200B and Smartcom II™ software. Everything you need. And more.

Whether you're receiving updates from the field, placing orders with suppliers a thousand miles away, or taking advantage of the diverse resources offered by networks and information services. Let Hayes provide the communications link. With our popular 1200 bps Smartmodem. Now available as a convenient plug-in board for the IBM PC. And packaged with our own communications software.

Smartmodem 1200B. Your computer's telephone. That's really what it is. A telephone that allows your computer to communicate over ordinary phone lines at up to 1200 bits per second. For speedy, economical transmission of data to any Bell 212A or Bell 103 type modem. And it's the one peripheral that vastly expands the usefulness of your computer.

Our single board Smartmodem 1200B can be installed by your computer dealer in minutes. It connects directly to your phone jack, operating with rotary dial, Touch-Tone** and key-set systems. Smartmodem 1200B will dial, answer and disconnect all of your calls automatically. It will even redial your last number upon command.

Smartmodem 1200B also features an automatic speed selector, that detects incoming transmission speeds. Along with screen displays to show you its current operating status. And, unlike some 1200 baud modems, Smartmodem 1200B operates at full or half duplex, for compatibility with most time-sharing systems.

For those who enjoy designing their own programs, Smartmodem 1200B is controllable using *any* programming language. But none of that is necessary. Thanks to Smartcom II. The communications program designed by Hayes, specifically for Smartmodem!

Smartcom II companion software. Maximizes Smartmodem's capabilities. Minimizes your effort. The first time out, you'll be creating messages, sending, printing and storing them to disk. Simultaneously.

And when you're on the receiving end, your IBM PC will do all the work, completely unattended!

But that's just part of Smartcom II's innovative story. For instance, before you communicate with another system,

Hayes®

Imagine. Your computer can receive, print and store data, concurrently. Without your even being there!



you need to "set up" your computer to match the way the remote system transmits data. With Smartcom II, you do this only once. After that, parameters are stored in a directory on Smartcom II. Calling or answering a system listed in the directory requires just a few quick keystrokes.

You can store lengthy log-on sequences the same way. Press one key, and Smartcom II automatically connects you to a utility or information service.

And if you need it, there's always "help." One of several special functions assigned to your IBM function keys, this feature explains prompts, messages, etc. to make communicating even easier.

Smartcom II also provides a directory of the files stored on your disk. Letting you create, display, list, name, re-name or erase any file right from the screen.

Like all our products, Smartcom II and Smartmodem 1200B are backed by excellent documentation, a limited two-year warranty, and full support. From us to your dealer to you.

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A complete plug-in communications package for the IBM PC.

Smartmodem 1200B. (Includes telephone cable.)

Smartcom II communications software.



Requires an IBM PC with minimum 96K bytes of memory; IBM DOS 1.10 or 1.00; one disk drive; and 80-column display. No serial card or separate power source is needed.

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Sold only in the U.S.A.

CIRCLE 259 ON READER SERVICE CARD

deep. This is a complex program with a lot of capabilities. The manual does not offer an index—or even a rational scheme of organization. I have never done more frantic page-flipping than in trying to learn about this program. As I use *Smartcom II*, I keep discovering nifty features, like a way the program can send form feeds to the printer to skip over perforations, but I can't for the life of me find any documentation on them.

The Escape key, usually the only way to return to a previous menu, is so casually documented it's woefully easy to miss. Hayes makes matters even worse by calling a key other than the Esc key the Escape Key (F1 by default). Sometimes the Esc and Escape keys perform the same function; sometimes the Esc key does absolutely nothing. You find this out only in the manual's troubleshooting section.

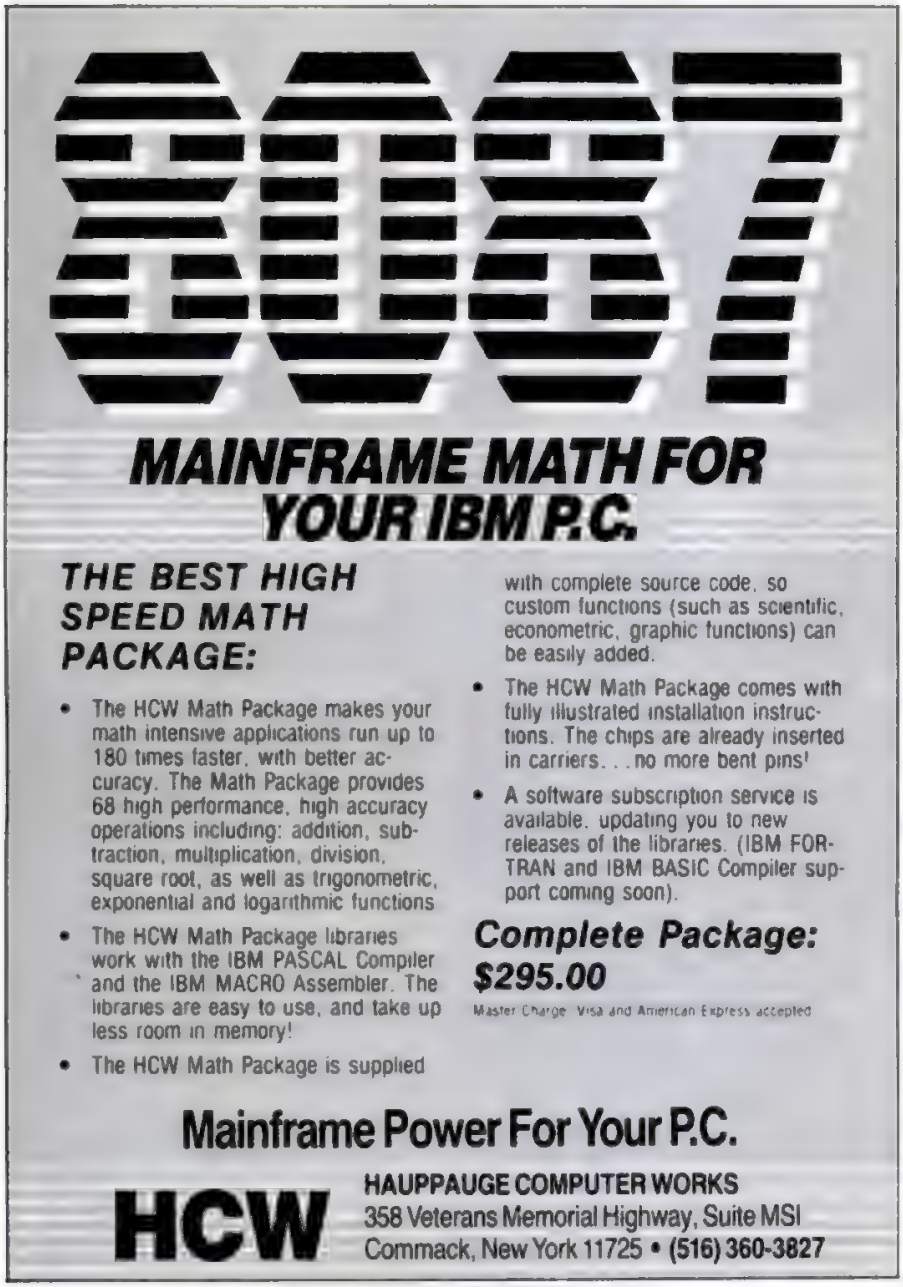
HAYES HAS included macros for accessing some much-used features of such popular services as The Source, CompuServe, and the Dow Jones News/Retrieval Service.

The functions of such keys as PgUp and Home are mentioned in the introductory chapter and then utterly forgotten. Also in the introductory chapter, and nowhere else, is some truly arcane information about cursor positioning sequences for terminal emulation. There are plenty of step-by-step examples of communicating with remote computers, but these are often given in place of true how-to instructions rather than as an addition to them. I can see many novices will wag their heads in utter befuddlement.

The manual betrays the haste of its creation in other ways, too. Two graphs depicting the difference between analog and digital communications have their captions switched. And the rare cross references to the other parts of the programs always refer you to a chapter, never to a specific page.

The troubleshooting section isn't bad, though, and if you can find what you're looking for, the reference pages in the back can help. But there's no table of error messages. I got a "File Error" when trying to write a file to an empty drive, but that message doesn't seem to be documented in the manual. Nor are such surprises as the fact that when you're using the remote access feature, the remote machine's disk directory is sent to you as a file called SCOM.$$$.

True, there is copious on-line Help,



CIRCLE 258 ON READER SERVICE CARD

but, like the manual, it depends too much on computer jargon and is often less than helpful. Still, the on-line Help is a whole lot easier to find than anything you'd have to look up in the manual. It's nearly always there at a press of the F2 key; when it isn't, you probably don't need it.

Hayes would be wise to produce some completely revamped documentation. While Hayes does this, it could redo the Smartmodem's manual, too. That book is a hacker's delight, a user's despair.

The Hayes limited warranty says that the disk will be free from defects for 90 days, but makes no promise that the program will work. This kind of obnoxiousness is getting to be Standard Operating Procedure in the industry, and it's especially sad to see it coming from a company as highly respected as Hayes. It's one thing to complain, as some manufacturers do, that there's no way to know what kind of crazy equipment a user might have; but *Smartcom II* is a program designed to run with two specific pieces of equipment: the IBM PC and the Smartmodem. I mean, is Hayes worried that you might have a laser printer that *Smartcom II* won't support, or what? At least it provides a helpful during-business-hours hotline—to be used at your own telephonic expense. My one experience with it got me some woefully incorrect information.

If you believe the warranty, your sole recourse in case of trouble is to get a new program disk free if a problem occurs within 90 days, or pay "the applicable replacement fee" if the problem occurs after that time but before you've owned the program 2 years. And that's permitted only if the problem is not your fault. There's no indication of what to do after 2 years, or if in the meantime your tipsy brother fails in an attempt to balance his piña colada on the edge of your disk. But there is an indication of what a replacement disk will cost you during the after-90-days-but-before-2-years period: 20 bucks. The warranty adds, "but this fee may change . . ." Downward? One suspects not. Any update policy? Hayes doesn't say.

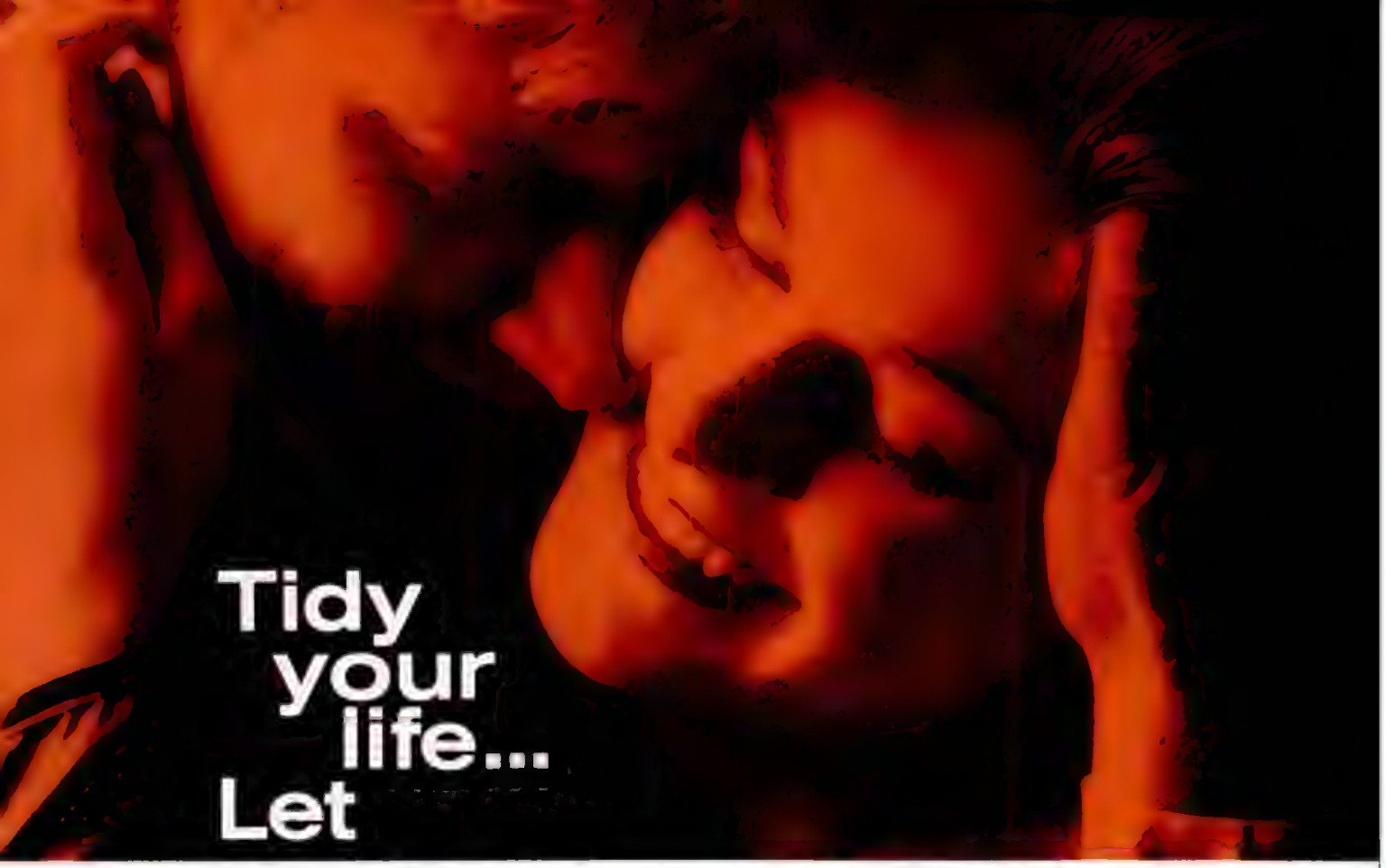
From talking with the people at Hayes, I get the distinct impression that they're not going to be as strict about their replacement policy as the warranty would have you believe; they will probably supply updated versions for the $20 fee. It would be nice if they'd tell this to the legal eagles who undoubtedly wrote the warranty.

The Winner?

Smartcom II is smart, all right, but it could be a lot smarter. If you're no fan of menus, *Smartcom II* will not be to your liking. Since there is no free trial, I'd emphatically recommend you try a test bout (including a few rounds with the manual) before you render your final decision. And, no matter what modem you're using, you'd be smart to spar with *PC-Talk III*. It just might knock you out. Or at least win on points. */PC*



CIRCLE 155 ON READER SERVICE CARD



SHOEBOX™

schedule your affairs!

The fact is, you're probably spending too much time trying to keep track of your time and your expenses. Aren't there other things you'd like to do?

Do you suffer from any of these symptoms?

- **Missed appointments**
- **Blown deadlines**
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If you answered "yes" to any of the above, SHOEBOX can help you. It's a complete system for managing time and expenses that's *really* easy to use. This SHOEBOX can hold and organize all those little scraps of information that turn so quickly into a hopeless jumble.

SHOEBOX provides unique features:

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- **One for all:** A single operator can coordinate schedules for many individuals
- **Ease of use:** *No* knowledge of programming languages required...Single-keystroke commands...Lots of *on-screen* help for the new user...
  Help *always* available—never more than a keystroke away...A User's Manual that's actually readable...Sensible defaults for data-entry options.

SHOEBOX offers a lot. What does it ask of you? Just an *IBM Personal Computer* (or compatible system) with 128K of memory, one floppy-diskette drive and, optionally, a printer that can put at least 80 characters on a line.

Suggested retail price is **$195**

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CIRCLE 463 ON READER SERVICE CARD

LEGAL/DANIEL REMER

The PC legal correspondent assesses the impact of computers on his Silicon Valley practice.

PC-AT-LAW

This week I negotiated a software license agreement for one client, an original equipment manufacturer (OEM) contract for another, and proposed a merger on behalf of a third. Not unusual work for a lawyer, except that I never left my house. In addition, I reviewed a "carbon" copy of a sales proposal, "mailed" a letter to a colleague, and sent a manuscript to a typesetter. Again, nothing unusual except that I didn't use paper, envelopes, or stamps.

For several years microcomputer users have envisioned the office of the future. While there is still much progress to be made, the automated office is fast becoming a reality for my law firm. Not only does the computer make it possible for the misanthropic among us to avoid business meetings, it also changes the way we work and occasionally allows us more time to play.

In our offices, we have our PCs working on a variety of tasks: word processing, telecommunications, litigation management, as well as simple file management and billing.

Our Computer Cornerstone

Word processing is the real mainstay of our firm. Everything from contracts to wills is typed on our PC. (Unlike most traditional firms, we make relatively little use of dictating equipment except for short letters.) First, we input a rough draft of a document. Then we edit it to our satisfaction. Sometimes another member of the firm will review a document, making changes or comments on the screen. When we agree on a final form, the document is checked for spelling, and then printed. Because a contract usually goes through several revisions during the negotiation

process, our firm prefers the page-oriented word processing features of *EasyWriter II*. This allows us to jump from page to page on the screen and to follow along on the printed manuscript.

Another great time saver is our library of form contracts on computer file. When we start to write a new contract, we extract from the file what is appropriate and modify it as necessary. As the library grows, the amount of entirely original drafting decreases. The key here, of course, is keeping all the work carefully indexed so that it can be readily retrieved.

It's surprising how many law firms, even those that represent computer companies, still don't word-process their documents. Instead, they retype them draft after draft, introducing fresh typos and omissions with each revision. The next time you get a document from a lawyer, hold it up to the light and look for the telltale impressions left by the self-correcting typewriter. The only use for a typewriter in our firm is addressing envelopes.

Let Your PC Do the Mailing

I live about one tense hour from my law firm in Silicon Valley. I often prefer to work at home and forgo the race to the office, except when it's necessary for a face-to-face meeting. This month alone, through our telecommunications setup, I've saved about 30 hours of commuting and about 40 gallons of fuel. More important, I've been able to respond more quickly to clients.

Sometimes we draft a document at home and send it to the firm's PC for final checking and printing. Someone, of course, must be at the office to set up the computer to receive the document. Since our schedules all vary, and since the computer is often tied up, this presents some logistical problems.

THE ONLY use for a typewriter in our firm is addressing envelopes.

Lately, to get around this inconvenience, we've been putting documents in our Source mailbox so that the sending and receiving computers need not be online together. This means that I, doing much of my work after 10 p.m., can have a document waiting in our firm's mailbox for my early-bird partners. The Source has also introduced an encryption feature that allows sensitive documents to be sent in code. Conveniently, some of our clients subscribe to the Source or to other electronic mail services such as Tymnet. We find ourselves routinely sending documents to their mailboxes for review. Unfortunately, I know only a handful of attorneys who can accept electronic mail.

We also use telecom to gain access to some of the many on-line databases that have become available. While we still use a traditional law library, our most cost-effective way of conducting research is through Westlaw, which, at about $90 per hour, offers substantial legal resources and is a very powerful research tool. We also make occasional use of the many databases offered on Knowledge Index, a subset of the Dialog database.

The PC Goes to Trial

I am currently experimenting with the free-form data manager, *DataFax* (Link Systems) for litigation support. The free-form structure of the program allows me to enter descriptions of (or direct quotes from) the numerous documents associated with a particularly complex case. Normally a cross-index of all documents would have to be painstakingly organized. Using *DataFax*, this cross-index is created semiautomatically. Several hundred records, case citations, and dates can be cross-referenced in numerous ways that would be impractical without a computer. This extensive cross-reference system helps immensely at a trial by allowing instant access to documents, case citations, people, and dates.

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■ Max tables open at once	2	1	Unlimited
■ Max records per table	65,535	2,048	65,535
■ Query multiple tables with a single command	No	No	Yes
■ Dynamic sort of query output	No	No	Yes
■ Multi-level control breaks	No	No	Yes
Use a spreadsheet?			
■ Rows by columns	0 x 0	2048 x 256	255 x 255
■ Cell can extract data from independent tables	No	No	Yes
■ Cell can be entire program	No	No	Yes
Make screens, forms attractive?			
■ Color, reverse video, blinking, half-intensity, bell	No	No	Yes
■ Form-at-a-time processing	No	No	Yes
Safeguard data?			
■ Passwords, data encryption	No	No	Yes
■ Field level read/write protection	No	No	Yes

The information in this table is believed to be correct based upon vendor documentation but cannot be guaranteed.

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indexing for both. Most databases can be easily set up to provide reports for file management. We are currently trying to determine whether a vertical application (a set of customized input and report masks) of a standard database program (*EasyFiler*, IUS) will be as effective as a program designed especially for law office file management.

Getting Paid without Getting Swamped

We've experimented with three approaches to our billing. The first method involved simply making up a sample invoice on one page of *EasyWriter II* and copying it onto a new page when a bill was to be sent out. Then the actual billing information was typed over the sample form. The new bill was printed and a duplicate of it saved in a long document file consisting only of bills.

The second method consisted of using a *VisiCalc* template to create bills. The advantage of *VisiCalc* is that it does the arithmetic for you. The disadvantage is that it is inconvenient to enter long descriptions of the services rendered. While both billing approaches work, neither is entirely satisfactory.

We are now testing a new legal billing program. It's too soon to know whether it will be the best solution. It allows for itemization of services by date and service-code number, and it contains an accounts-receivable module that allows us to send out statements and age invoices.

The New Office of the Future

I think that microcomputers will have an increasing impact on how lawyers do business. An important implication for a firm of our size (three lawyers) is that the PC allows us to handle greater work loads than we could manage before. More importantly, we enjoy the luxury of remaining a small firm that can still compete with even the largest firms in terms of what lawyers call "quality work product." We aren't held up by typing pools or the U.S. mail, and we aren't buried by cases involving large amounts of paperwork. We can respond faster, more accurately, and more directly because of our computer power. */PC*

Daniel Remer is completing his second book, Computer Power for Your Law Office *(Sybex).*

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CIRCLE 413 ON READER SERVICE CARD

If your thirst for technology is combined with an interest in the IBM Personal

A N N O U N C I N G

PC TECH JOURNAL

FOR IBM PERSONAL COMPUTER USERS

To The Limits... And Beyond

As you well know, the IBM Personal Computer is proving to be the success story of the 1980s. Only 18 months after its introduction, the IBM Personal Computer commands almost a fifth of all personal computer sales—a remarkable achievement. At present the number of IBM Personal Computers in users' hands exceeds a quarter-million, with perhaps as many as half a million on the way in the next 12 months.

But despite its widespread public acceptance and the wealth of products now available to support it, we are convinced that *vast areas of its potential remain unexplored,* not to mention those products waiting to be introduced for which the IBM Personal Computer is the precursor.

For those serious enough about microcomputers to accept the challenge, the IBM Personal Computer represents a host of untapped possibilities.

For those with a genuine appetite for technology, there are ways of stretching the IBM Personal Computer to the very limits of its specifications. Ways to willfully expand those specifications...to throw light into the dark recesses of its complex software systems. Ways to enlarge our understanding of the equipment and to *increase its usefulness.*

If this sounds appealing, then *PC Tech Journal* is for you. For it will be the definitive source of authoritative, technically-satisfying information about your IBM Personal Computer, its future transformations and the host of products developed to support it.

Why a Technical Journal?

The readership of *PC* Magazine has, in the last year, grown at a rate to match the success of the IBM Personal Computer itself. But as the number of committed readers has expanded, so has that portion of users who are not only interested in *output*—that is, using the IBM Personal Computer to better solve problems—but who care deeply about the *process* of the computer itself.

We consider you to be among that select group of readers. Your relationship with microcomputers, vocational or otherwise, has led you to levels of technical competence and curiosity which go far beyond problem-solving. In effect, you have a compelling interest not only in *what* your IBM Personal Computer does, but also *how* it does it and how it can do more.

For you, technological sophistication is a welcome challenge, perhaps even something of an adventure.

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Independent businessmen and professionals who understand the increased benefits of tailoring their IBM Personal Computers to their own specific demands.

Members of the scientific and academic community whose ability and training allow them to enhance their use of their IBM Personal Computer.

And, of course, anyone with a genuine appetite for state-of-the-art information about the emerging possibilities presented by the IBM Personal Computer.

A Menu for Technical Gourmets

Under the leadership of Editor-in-Chief Will Fastie, author of the widely respected "IBM Images" column in Creative Computing Magazine, we've assembled a staff and a stable of regular contributors all with just the sort of demonstrated expertise you'd expect from *PC Tech Journal*.

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- *Elegant programming methodologies which exploit the IBM Personal Computer's various operating system environments, plus reviews of new operating environments.*
- *Evaluation of the IBM Personal Computer's communications protocols and standards, including a detailed discussion of computer-to-computer interconnection, terminal emulation and distributed data processing.*
- *Plus a range of articles on networks, mass storage and important user development tools.*

Moreover, as *PC Tech Journal* evolves, it is our explicit intent that you, our readers, play an important part in shaping the magazine. For we are convinced that it will be you who shape the future usefulness of the IBM Personal Computer itself.

To that end, we will make a special effort to involve you in the focus of the magazine, listening to your needs and together forging workable technical solutions to fully take advantage of IBM's revolutionary Personal Computer.

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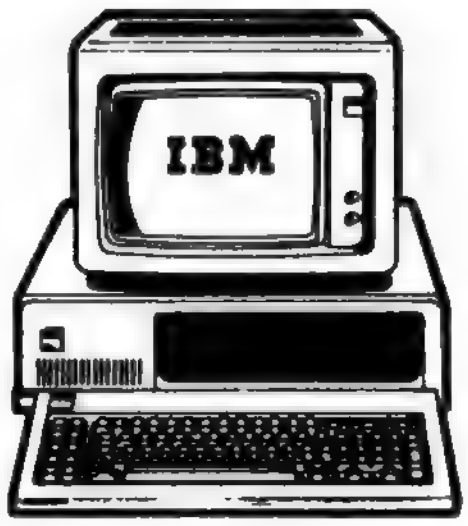
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CIRCLE 178 ON READER SERVICE CARD

DRI insists that the attention it's now giving to PC-DOS does not mean that it will abandon CP/M-86 for the PC. What it means, according to marketing manager Carmen Governale, is new opportunities for DRI, software manufacturers, and PC users.

The New View From Digital Research

Digital Research's late May announcement that all of its powerful languages and utilities will include PC-DOS versions has far-reaching repercussions, especially for software applications developers. An interview with Carmen Governale of DRI's Language Division reveals some of the insights behind this move and answers many of our questions about what it means to the industry.

Digital Research will soon begin selling PC-DOS versions of its popular languages and utilities. This announcement has special importance for software vendors. It should mean increased sales for them and Digital Research. The concept behind these new versions is *portability*.

Portability means that a program's source code, the part saved in ASCII format, can be compiled on a CP/M-86 system or a PC-DOS system. It will work exactly the same way on both systems. Let's take a look at what this means to a software applications developer who has, for example, developed a word processor package written in Pascal that will compile and run under CP/M-86. Now the developer can take that same source code, compile it under PC-DOS, and sell it to the large PC-DOS market. With very little extra development time, the software vendor has greatly increased his potential sales. This also means that Digital Research also can expect more sales for its language products.

WITH VERY little extra development time, the software vendor has greatly increased his potential sales.

Many people probably associated the Digital Research announcement with its recent price adjustment for CP/M-86. The DRI operating system price was cut to $60 so that it could compete more effectively with PC-DOS. Digital Research admits that CP/M-86 was slow getting off the mark due to the late introduction of the operating system by IBM and by the high original price (compared to PC-DOS). DRI insists, however, that the introduction of PC-DOS compatible languages was made for entirely different reasons. The introduction may help CP/M-86 gain some popularity, although many observers remain skeptical.

In late April I talked with Carmen Governale, marketing manager for the Digital Research Language Division about his company's then forthcoming announcement. We talked about the languages that would become available (and when), the reasons and history behind the decision, future goals, and other important issues.

HUGHES: *Which languages and utilities will be available from Digital Research to run on PC-DOS? What is the timetable for introduction of these packages?*

DRI: We will be introducing most of our languages and utilities near the end of May or early June. CBasic compiler (CB86), Pascal MT+86, PL/I, C (later June), Level II Cobol, ASM86 relocatable assembler, SID86, Display Manager, and Access Manager will all be available to PC-DOS users during June.

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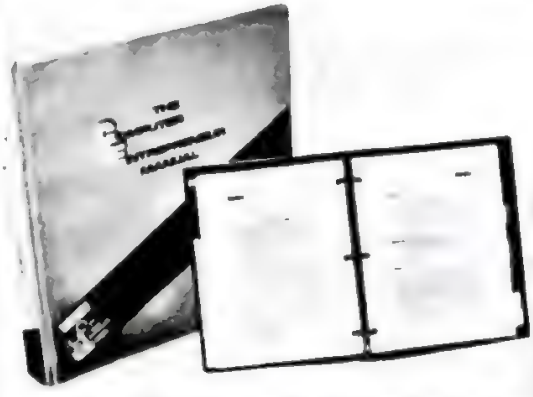
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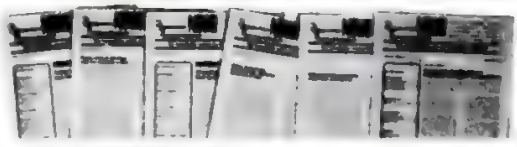
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CIRCLE 193 ON READER SERVICE CARD

HUGHES: *Why should someone who has PC-DOS choose DRI's version of a language over versions already available?*
DRI: I think that anyone who has bought any of our products in the past has done so because he can count on our technical support and because our software works. We have built a good reputation here at DRI. The new languages available to PC-DOS users will be bought with that reputation in mind.

HUGHES: *When did DRI make the decision to create PC-DOS versions of its languages? Who was behind it?*
DRI: The decision was made in September, 1982. Many people were involved in the decision. It was backed all the way by Gary Kildall, and then I inherited the job of pushing the project through.

HUGHES: *CP/M-86 was offered late to PC users by IBM and the price was considerably higher than for PC-DOS. You were forced to offer CP/M-86 at a lower price to compete with Microsoft, which was grabbing the lion's share of the 16-bit market. What is the history of the decisions and strategies by DRI, starting with the original agreement with IBM, the price cut, and now the introduction of PC-DOS compatible software?*

IF WE CAN provide users with a language that runs on many different machines, they make more profit and so do we.

DRI: I need to go back to February, 1982 to help you understand how this project just naturally evolved. DRI had just reorganized into three groups in order to better serve the different markets we were going after. We formed the Languages, Graphics, and Operating Systems Divisions to operate fairly independently of each other. In our group, the Languages Division, we asked ourselves, "How can we be most successful with our languages?" The answer we arrived upon was, "We need to have our languages run on as many different operating systems as feasible." You have to remember, our main thrust at DRI is Independent Software Vendors (ISV) support. If we can provide users with a language that runs on many different machines, they make more profit and so do we.

The key to the whole issue is portability. When you can take an applications program in source format, move it from CP/M-86 to PC-DOS, and have it work exactly the same, you have portability. This is what our customers want and this is what we want to accomplish. Obviously, PC-DOS has made great market penetration on the IBM PC; we have to admit that. With this in mind, we decided to attack that market first. This is the history behind the decision. The fact that CP/M-86 has not done as well as DRI had hoped has nothing to do with our decision to create more portabilty with our languages. The decision by the Operating Systems Division to lower the cost of CP/M-86 was made for entirely different reasons.

HUGHES: *You mentioned that you decided to produce PC-DOS versions of your languages first. What other operating systems can we expect to see DRI selling languages and utilities for?*
DRI: We will probably go after the UNIX system next. We hope to have a family of languages that will run on most mini-computers and microcomputers. UNIX would provide us with a good number of mini-computer customers.

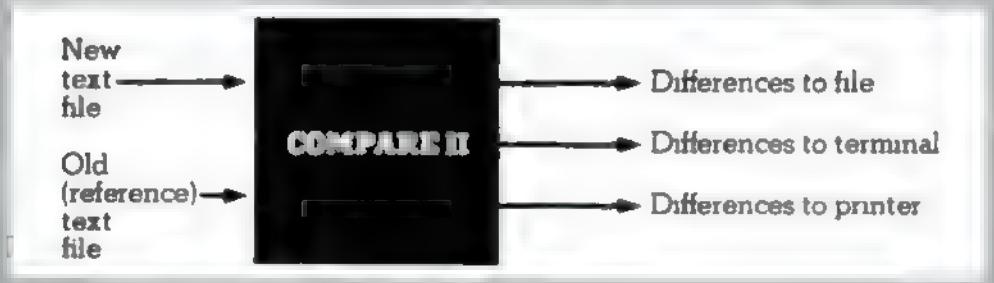
WE WILL probably go after the UNIX system next.

HUGHES: *What about UCSD p-system? Will you develop your languages for that operating system?*

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DRI: Probably not, since their philosophy of operating systems is so different from ours. We write code for the actual machines; they write their software for a "pseudo-machine." It would be technologically difficult for us to develop our languages for their system.

HUGHES: *Does the introduction of PC-DOS compatible languages mean that DRI is conceding the dominance of the MS-DOS 16-bit operating system for the time being?*

DRI: No, I wouldn't say that. PC-DOS has made great strides into the PC marketplace. I think that CP/M-86 will reassert itself soon. We also have very high hopes for our Concurrent CP/M-86 that has almost unlimited potential.

HUGHES: *Does this new strategy represent a change in direction and goals for DRI?*

DRI: No. As I said earlier, we have always considered our support for ISVs important. The ISVs are our biggest customer by far. Creating more portability for our languages and subsequently the ISV's application programs has been a goal of DRI for a while now. The introduction of PC-DOS compatible languages is a natural result of our goals.

HUGHES: *DRI is now intimately knowledgeable with both the PC-DOS and CP/M-86 operating systems. Is an operating system that combines the good features of each and that can handle both file and data formats a possibility in the near future?*

DRI: That is an interesting question. I do not know of any such project at DRI. Also, I believe it would be technologically difficult.

HUGHES: *At one time, it was virtually impossible to get a call through to your technical assistance department. I understand that DRI has made some changes to this department. What are these changes, and will DRI be able to meet the service needs of all its existing CP/M clients and your new PC-DOS users?*

DRI: We have made some changes to help handle the volume of telephone calls we were receiving. After analyzing the situation, we realized that we basically had two groups of end users. The first is what we call the "passive users." They want answers to general questions; they tie up the phone lines. We have set up a general information network on The Source for anyone who has this kind of questions. We have also tried to provide more support for our dealers so that they can answer their clients' questions. The second group is the software developer. He is our biggest client and needs his technical questions answered promptly. We have set up a different phone number for ISVs, and they have to pay a small price for this "guaranteed support." But as software developers, they will want this extra support and will be willing to pay the small charge. ***/PC***



CIRCLE 424 ON READER SERVICE CARD

The Compare II Story

as told by
L.L. "Bill" Packer
Director of Engineering
Solution Technology, Inc.

About a year ago, our company had a problem we solved by writing a utility program called COMPARE. I was asked to tell the story about how COMPARE evolved and why you might want to have your own copy. This engineering story spans about one year.

Early in 1982, Solution Technology, received a contract to implement a hard disk file server and database system using IEE-488 communications links and Digital Research's MPM-II operating system. Here's the kicker, the project had to be done between the first of February and the middle of April. In all, I had five programmers working on seven different computer systems; some with hard disks and some with floppies. With so many machines, programs and archive floppies involved, plus an around - the - clock work schedule, all normal source control methods were a joke. Our two biggest problems were; what was broken when a program used to work, and who changed what when two programmers "fixed" something? I tried a number of different conventional control systems that only held the problem at bay. In the end, the control problem became so acute that I assigned a couple of my best software engineers to come up with a way to compare two source files. Well, they designed a traditional file compare program called, naturally, COMPARE, and that program made our software control problem at least manageable. COMPARE 1.1 was effective but slow, so we ran it mostly on the hard disks.

COMPARE 1.1 was a useful program, but it needed work. First we had to remove the file restrictions so differences between files could be ANY number of lines long. Second, we needed the program to be able to compare the two input files in something less than an eternity. So back into the lab we went to see what software technology could be applied. We added a pinch of database philosophy and a dash of communications technique, and the result was COMPARE 1.2... a fast, line oriented file compare program which was very useful for programs and data files.

A short time later we were updating a technical manual for another contract and had to put change bars in each new issue to tell the end user where the changes were. Since text updates had been made by a number of people at different times, we attempted to use COMPARE 1.2 to locate all the places that had been changed. While somewhat successful, we still had to draw the change bars by hand. This was a huge waste of time because the process had to be repeated for every new issue. Enough! Time is money, so back into the lab. First to add word by word scanning and second, to be able to generate change bars automatically. Again success! We created COMPARE 1.3.

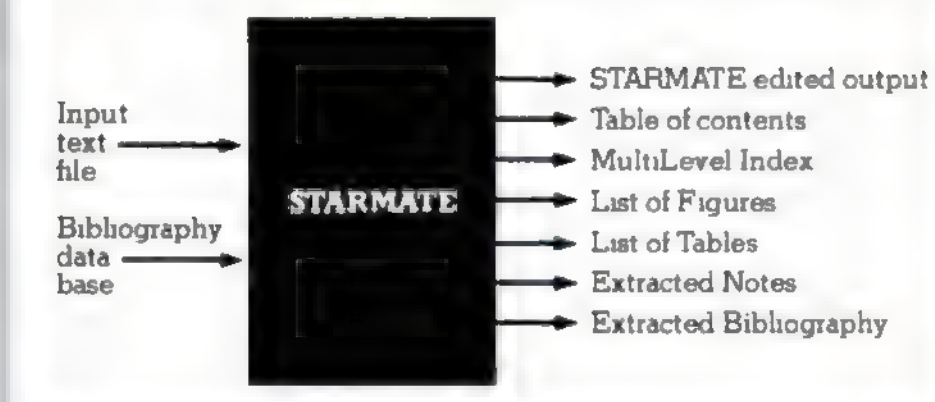
We have been selling COMPARE 1.3 for nine months now with hundreds of sales, excellent reviews, and customers telling us that we have a fine text analyzer. We've been pleasantly surprised at how many writers and lawyers have been using this package successfully. Even so, some said, "Why don't you have a version for the IBM-PC and CP/M-86?" We listened. During the first months of 1983, we returned to the lab and added the most asked for features to the CP/M-80 version then did the code conversions for CP/M-86 and PC-DOS. What resulted was COMPARE II. In COMPARE II we give the user the ability to customize for his own default file name extensions, internal editor file formats, strings for change bars, strings, for difference highlight on and off, printer width, output to console, full document side by side listing, definition of comments (to ignore) and much, much more.

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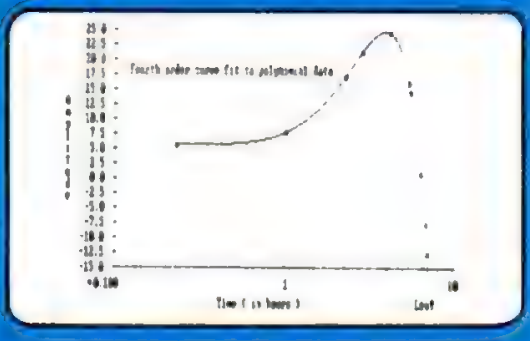
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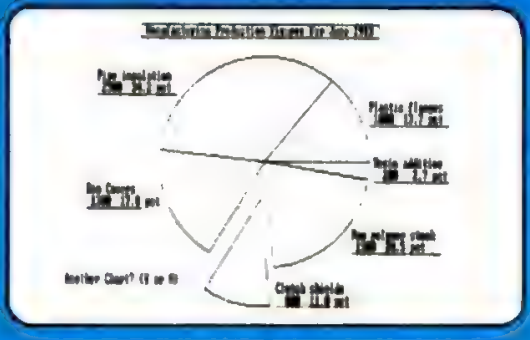
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claims. In fact, the program will do windows, but in a fashion quite different from the ammonia-and-squeegee routine you might expect.

It's not the ultimate software package, however, and it has its own problems, idiosyncracies and limitations. If you plan to analyze the entire U.S. economy, a high-powered spreadsheet would do a better job. If you're going to write novels, a dedicated word processor would be easier to use. But if your needs are modest, *T/Maker III* might be the only software you'll ever need.

The "T" in *T/Maker III* stands for "Table," since making tables is the function the program handles best. A table may be anything from a list of the calorie contents of diet foods to the entire bookkeeping system of a small business. In the land of computers, tables lie somewhere between spreadsheets and documents, and have some qualities of each.

Not content with just filling the middle ground between the two most popular type of business software, *T/Maker III* spreads out its capabilities in both directions. After all, the same computer routines that put columns of numbers on your monitor screen and move them around can easily work with words; the same math functions that calculate the numbers in tables can handle spreadsheets as well. Combine all these functions (and then some) and you have a software package that defies classification.

ITS LIST of self-professed abilities does come close to being all-inclusive.

A label that might be affixed to *T/Maker III* is "integrated data base management system with word processing," but that swatch of computer lingo doesn't come close to telling its whole story. Work with *T/Maker III* for a while and you'll discover it acts like a cross between an application program and a programming language like BASIC. Not only can you use it for simple chores like writing business letters and balancing your checkbook, you can even

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use it to run programs of a sort. You can dump in numbers and let them churn around for a while, and in seconds or minutes an answer magically appears.

Then again, *T/Maker III* is unlike a computer language in its human-like approach to problems. Rather than writing program lines in a specific sequence, you only need to physically arrange data and instructions into a table on your PC monitor screen and *T/Maker III* will do the rest.

Yet *T/Maker III* shares one very important quality with higher-order computer languages—its real world applications are limited only by your imagination and ingenuity in using it.

Unwrapping the Package

T/Maker III's heritage became obvious with my first look at the documentation. The printed material reveals that the program began life in the CP/M operating system and was only recently adapted to the PC. Along with its thick *Reference Manual* and slick *Quick Reference Manual* comes an addenda sheet for IBM PC owners and, with recent copies, an added quick reference sheet dealing with "Editing Keystrokes for IBM Users."

Aside from the temporary look of the addenda sheets, the translation has been quite successful. The only outwardly visible change between the IBM version in PC-DOS (also available in CP/M-86) and the 8-bit CP/M-80 version is that some of the command keys have been reassigned to take advantage of the versatility of the PC's keyboard.

The 2½-inch-thick *Reference Manual* gives not only a reasonably easy to understand overview of the program and an introductory tutorial, but also a lengthy section on customization, which outlines how to reassign the command and function keys to suit your particular preferences and prejudices. This explanation is a feature that other software companies would do well to emulate.

The *Quick Reference Manual*, colorfully printed on heavy-duty, plastic-coated cardstock, gives a brief look at all the possibilities *T/Maker III* has to offer and a summary of the key-and-command combinations used to achieve them. Because *T/Maker III* is not menu-driven, this booklet is particularly valuable for those users—like me—who are too impatient to work through the tutorial.

On starting up the program, the first thing you see (after the copyright notice greets you) is a screen completely blank except for a lonely prompt. Although similar in purpose (mostly reassurance) to BASIC's "OK," the *T/Maker III* prompt

PERHAPS the most important of all of T/Maker III's commands is EDIT, which unlocks its word processing capabilities.

includes more information. There are two numbers, indicating your location in the file you're working on ("1/1" when you start because you're in the first column of the first row), and a simple question: "WHAT NEXT?"

Your answer to that question must be drawn from a list of possibilities that is not overwhelming—*T/Maker III* uses fewer than three dozen commands. As with a programming language, however, a whole world can be built from this handful of instructions. Most of the commands require you to specify an operator or other parameters, so permutations can be created to perform a virtually endless range of tasks.

Many of the commands are dedicated to managing files. CREATE creates a new file; GET retrieves an existing one; SAVE fills an existing file with data that you have created with *T/Maker III*; and PRINT sends a file to your printer, just as you'd expect.

While most application programs automatically open a file whenever you start to work, *T/Maker III* resembles BASIC in its immediate mode, because you can do quick calculations and the like without bothering with a file. When working this way, your data stays in the RAM. However, *T/Maker III* requires that a file be created before any data can be saved; executing the CREATE command apparently destroys whatever you have in working memory. That means that if you don't create a file before you start thinking at the keyboard, you may have no way of preserving your work other than to print it.

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On the other hand, by preserving the previous version of any existing file that is saved, *T/Maker III* helps prevent mistaken revisions from becoming irremediable.

Further file managing commands within *T/Maker III* duplicate enough of the primary PC-DOS instructions that you may never need to look at the PC's operating system again. You can peer at the directory (FILES), erase a file (DELETE), rename a file (RENAME), change the logged disk drive (DATA) and more. A sequence of several instructions, however, must be used to copy a file.

Another group of commands allows you to combine files and manipulate their contents. SORT and ARRANGE can be used to reorganize tables and spreadsheets. TALLY will count occurrences of number or letter combinations in specified columns of a table. COMBINE adds a table from one file to a table in another.

Rather than merely operating one at a time, these commands can be stacked on top of one another. You can type in an entire list of commands followed by a press of the Return key; then T/MAKER III will execute them, one after another. A WAIT command can be used to insert a pause between commands, should you like.

The most important command for stacking is LOAD, which will fill a template of a table or "mask" (essentially a blank spreadsheet that has been previously created) with data from another file. This is how *T/Maker III* functions like a programming language: a lengthy list of files and commands can be stacked and the program will load file after file, do the necessary computations and manipulations, and save the results. While this is going on, you can adjourn to another room and fold together a sandwich.

T/MAKER III fails to provide line-by-line scrolling of the screen.

Working with Words

Perhaps the most important of all of *T/Maker III*'s commands is EDIT, which unlocks its word processing capabilities. Typing in this command will wipe the familiar prompt from the screen, and unleash new commands and an entirely different mode of operating.

Most accurately labeled a "screen editor," this function is the heart of the entire program. All information, whether numbers or words, is manually entered into files or worked upon through the editor.

The *T/Maker III* editor resembles most other word processors—it transforms the monitor screen into the electronic equivalent of a blank sheet of paper upon which you can write anything. Most standard word processing commands have been adapted to take advantage of the IBM-PC's generous endowment of function keys. Cursor movement, for instance, is handled from the keypad on the right side of the keyboard. If you, like me, have learned to process words with a program such as *WordStar* that uses a different arrangement of control keys, *T/Maker III* can be made easy to get along with. A separate program included with the software package, called *T/Modify*, gives you the most thorough and easiest-to-use customization procedure I've ever encountered. It allows you to reconfigure all of the available word processor commands to suit your tastes or previous training.

The first thing I did was to change over from the cursor control keys normally used by *T/Maker III* to the "diamond" of keys used by *WordStar*. That made adapting to *T/Maker III* almost painless.

It's not completely painless because *T/Maker III* omits some functions taken for granted in other word processors, and it does several things in unique ways which take some getting used to.

One of the biggest faults in the whole program is the lack of a "word left" cursor command. The choices for leftward movement are limited to single-character backspace and a full-line left by using the carriage return. *T/Maker III* also fails to provide line-by-line scrolling of the screen. Although the cursor can force the screen to scroll, the absence of true scrolling hinders you in running through long documents and makes the use of some of the program's advanced list processing features cumbersome.

Another shortcoming of the word processor is its method of moving text; most writers find an electronic cut-and-paste routine to be invaluable. In *T/Maker III*,

you must first either transfer the lines of text one at a time to a "buffer" or temporary memory (in which case the lines are removed from the screen) or copy them to

ALIGNING wedges can be inserted above the copy to indicate both the type of margin and the left and right margin positions you prefer.

the buffer (in which case they remain on-screen). Then you must move the cursor to the desired new location, and finally dump the buffer's contents back onto the screen. Since the screen displays everything that is in the buffer, you must remember to clear the buffer before moving anything or your results may not be as planned—particularly because the buffer can hold several hundred lines!

Take special note that text can only be moved as full lines. This is no problem when you're tinkering with complete paragraphs, but you can't pluck out a choice string of *bon mots* and put them in a more effective position within a paragraph.

What's bad for text is good for tables, however. Although the *T/Maker III* line-moving procedure is no delight in creating manuscripts, it makes rearranging tables and spreadsheets quick and easy. Columns of data can be quickly moved or copied without using the buffer.

Although *T/Maker III* may perplex you if you've ever used another word processor, it allows you to make a smooth transition from old-fashioned typing to modern keyboarding by giving you a choice of three modes of carriage return. The initial default, what you get when you first run *T/Maker III*, is manual carriage return, which works as on an old Underwood or what-have-you. If you don't press the carriage return key before you reach the right margin, the cursor runs into a brick wall. Pressing a two-key combination switches the program to "drafting" mode, which

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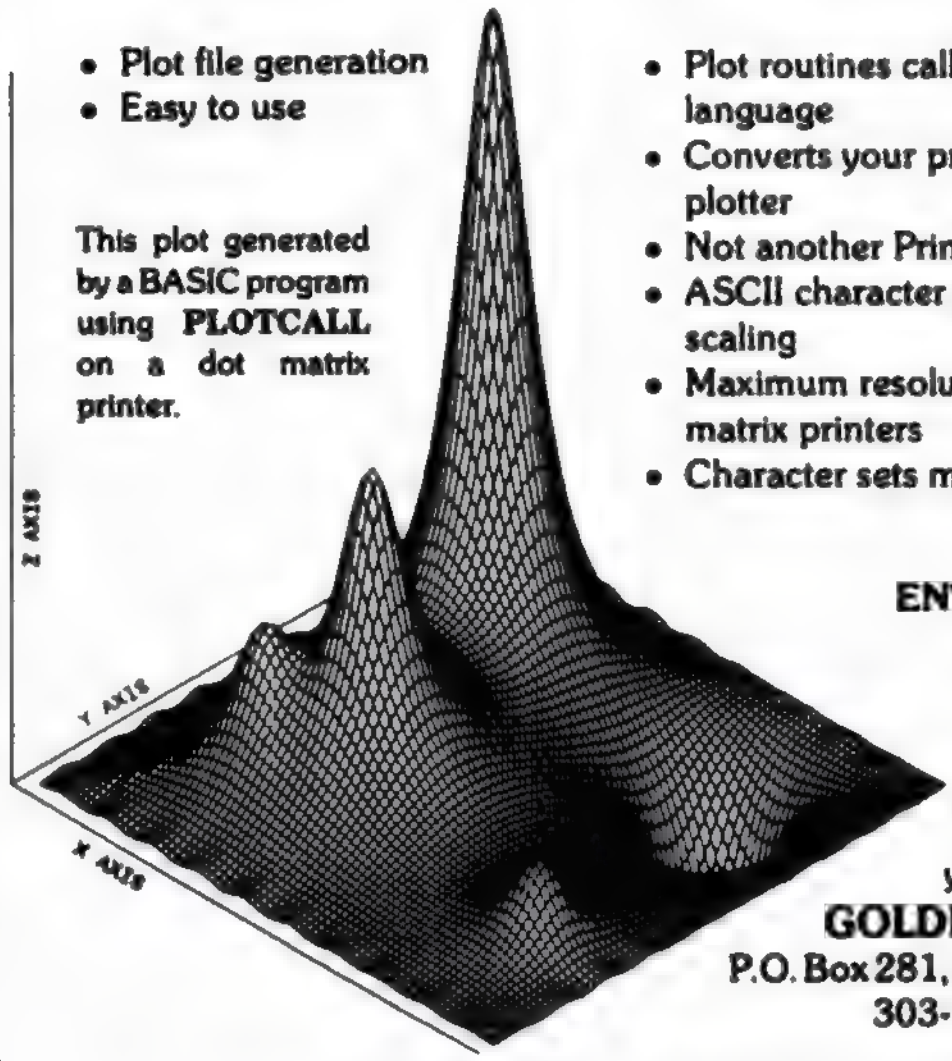
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T/Maker III Commands

The following are the major commands used by T/Maker III.

Files Management Commands
Clip
Create
Data
Delete
Do
Files
Get
Info
Insert
List
Merge
Notabs
Rename
Reset
Save
Stop
Tabs
Wait

Other Commands
Edit
Align
Print
Compute
Clean
Combine
Arrange
Match
Find
Replace
Drop
Keep
Sort
Tally
Bar
Load
Unload

gives the automatic carriage return/line feed action, known as word wrap, that is common in most word processors. Selecting another two-key combination elicits a "table" mode that has a nearly unlimited right margin; it is designed for making charts that extend into the widest reaches of computerdom—up to 400 characters wide.

The *T/Maker III* editor is not completely screen oriented—more precisely, it's not completely paper oriented. Normally, everything you enter is displayed on the monitor single-spaced. Double-spacing of the text, should you desire it, is performed only during printing by use of a command embedded in the text. But, at the point of initial character entry, both margins are preset and unchangeable, and text is displayed ragged-right—justification is not automatic.

YES, T/MAKER III does do windows.

None of this predetermined formatting is inscrutable. "Aligning wedges" can be inserted above the copy—both on the screen and on the printed output—to indicate both the type of margin (ragged or justified) and the left and right margin positions you prefer. After editing (or while stepping out of the editing mode for a second), by typing the command ALIGN you will cause *T/Maker III* to reformat the screen and the data. This approach is actually quite clever: it allows all margin position settings and types (justified, ragged right, centered text) to be permanently saved with the text, and permits all the various types and widths of margins in a single document to be set and saved without having to worry that reformatting will cause disaster. With a proper command, even tab settings will be remembered with the rest of the file—just try doing that with your *WordStar*.

Additional features of the *T/Maker III* editor include the "keystroke macro"; by pressing one button you can put a whole paragraph (or whatever) on the screen. There's also a "frame" mode, which locks part of the screen in place, say the captions, while allowing an area displayed on the screen, called a "window", to scroll up and down through a file of data. (Yes, *T/Maker III* does do windows.)

Getting It on Paper

Printing is a simple chore. Just give *T/Maker III* the PRINT command. The program will send the contents of its working memory, or any file, to the printer.

As it comes from the box, *T/Maker III* is ready to operate the IBM printer, and implement normal, underlined, and boldface typestyles. The customization notes

THE MAXIMUM possible file length for T/Maker III is 44,000 characters: that's about 16 to 20 pages.

in the *Reference Manual* include all the information you need to get an IBM/Epsom printer to generate its condensed or enlarged typefaces with skinny or normal spacing.

Other print formatting commands are also available, including those for setting paper length, locating the copy on paper, headings, margins, footings, page numbering, forced and conditional pages, and "blocking" text (locking a block of text or a section of a chart so that it will never be split between pages in printing). Pages can be automatically numbered and printed either clean or with the embedded commands displayed in addition to the text. The print procedure can pause to allow paper changes or it can run continuously with tractor-fed paper. Individual pages or sets of pages can be selected from long documents and routed to the printer.

The maximum possible file length for *T/Maker III* is 44,000 characters: that's about 16 to 20 pages. To produce longer documents, the program's print commands will allow several files to be printed with all pages numbered sequentially—one file can even be printed within another. Other built-in commands allow you to merge address lists into form letters. Elsewhere, this function is called mail merge; with *T/Maker III* this is included at no extra cost.

Although *T/Maker III* will automatically locate footnotes at the bottom of pages, it will not automatically number them. The only other feature of *WordStar* that this program does not provide is "microspace justification": with this you could add small spaces between letters instead of using only spacing between words to

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make the right margin straight. (Of course, the lack of this feature will only be noticed by users with daisy wheel printers capable of producing this effect.)

Unfurling the Spreadsheet

You'll probably find the spreadsheet function of *T/Maker III* to be quite different from any other spreadsheet you've ever run into. The underlying difference is its philosophy.

Most electronic spreadsheets are patterned after the accountant's pale green lined paper, which provides neat columns and rows forming pigeonholes that numbers can be squeezed into. The various electronic pigeonholes in spreadsheet software are related to one another by strange, abstruse formulae that are privy to but a few who meet on the Witches' Sabbath. The underlying relationships cannot be deciphered by a mere mortal not initiated as an MBA or CPA.

The spreadsheet portion of *T/Maker III* foregoes the pigeonhole structure and works more the way regular people do—all over the place. The spreadsheet is screen-oriented; what you see is what you get. It's an electronic *tabula rasa* for calculations. Rather than filling in the blanks, you type in numbers on the screen wherever you want, using the "editor" as if you were word-processing. You then exit the editor, command *T/Maker III* to COMPUTE and await your answers.

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		Champagne			
+	+	Laurent Perrier	0	35.00	0.00
+	+	Mercier	5	26.85	134.25
+	+	Moet & Chandon	47	24.56	1154.32
+	+	Piper-Heidsieck	3	25.90	77.70
+	+	Taittinger	2	21.89	43.78
=	+	Total	57	134.20	1410.05
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+	+	Chateauneuf-du-Pape	6	15.85	95.10
+	+	Cote Rotie	5	12.35	61.75
+	+	Crozes-Hermitage	11	13.95	153.45
+	+	Hermitage	10	15.32	153.20
=	+	Total	32	57.47	463.50
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+	+	Serriger Vogelsang	3	8.68	26.04
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+	+	Waldracher Meisenberg	1	6.95	6.95
+	+	Wehlener Sonnenuhr	12	12.85	154.20
=	+	Total	65	55.81	616.39
	avr	Average of All Wines	10	48.19	523.53
	=	Total of All Wines	255	1301.04	14135.33

Figure 1: A table created with T/Maker III. *The example line, highlighted across the top, instructed the program to calculate the totals printed in the far right column. Other totals and averages were calculated according to the operator symbols placed in the eight-character-wide column on the far left.*

The CLEAN command can eliminate all the highlighted material in this figure (the example line, operators, and irrelevant numbers) to produce a more attractive final printout.

IN EXECUTING the COMPUTE command, T/Maker III will straighten everything up, align the decimal points, and chop off digits of excess precision.

Of course, the software demands that you work within some structure. If you want a column to add up properly, there are certain prerequisites that must be followed. For example, your data must be arranged into a table.

T/Maker III requires you to write an "example row," which will tell the program where you want calculations to be performed and the amount of precision you require (see Figure 1). Both the location of the columns of numbers and the number of digits you want to use are specified by typing a row of 9s above each column of figures you plan. The number of 9s and the placement of the decimal point (or the commas in large numbers) in the example number determine the format of all the numbers below it in the columns.

As long as you have all the digits of each entry in a column below the example number, you can be as sloppy as you want when you pile your data in—decimal points and number positions need not line up. In executing the COMPUTE command, *T/Maker III* will straighten everything up, align the decimal points, and chop off digits of excess precision.

Should the number of digits in your final answer, or an intermediary calculation, exceed the number of 9s in the example row, *T/Maker III* will refuse to perform a calculation on the overgrown entry; instead, the program gives you an error

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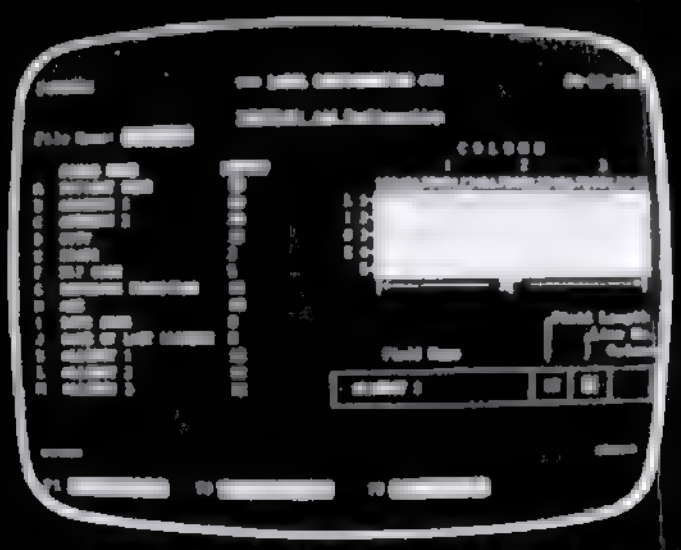
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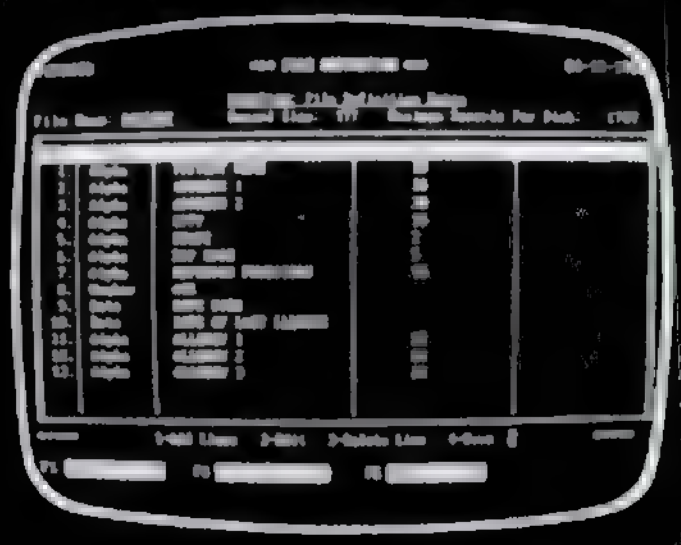
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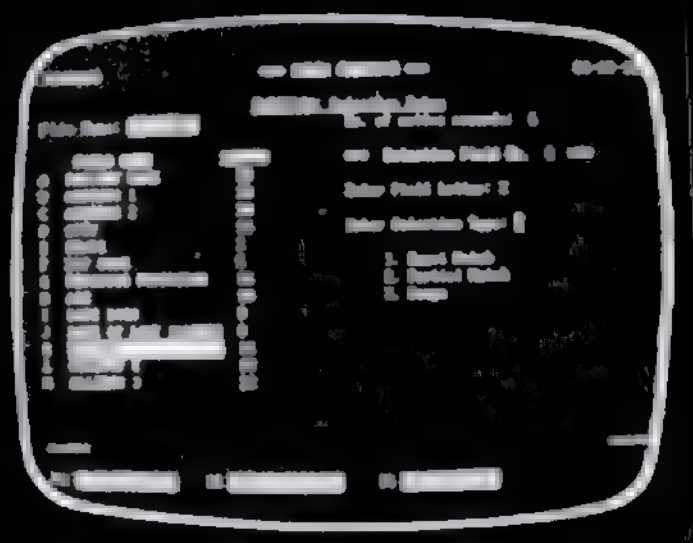
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message that cites the number of "minor errors" and fills the erring entry with asterisks. Usually it's a simple matter to go back to the example row, add sufficient digits, and recompute.

The only other restriction of *T/Maker III* is that your data columns must begin at least 8 columns in from the far left side of the screen. The forbidden columns on the left are used for mathematical operators (plus-signs for addition, hyphens for subtraction, asterisks for multiplication, and slashes for division) and terminators (equals signs, other symbols, and letter combinations for more complex operations, such as averaging, greatest element, and reciprocals). *T/Maker III* allows three columns of these operators and terminators, so that various computations can involve different rows of numbers. A row without one of these operators or terminators to its left is ignored in computation.

If there is more than one column of figures across the screen, the columns are operated on individually in a sequence from left to right. *T/Maker III* also can

H O M E W I N E I N V E T O R Y

French and German wines as of 15 July 1983, Listed by Cost

Cost	Wine	Bottles	Total
6.92	Urziger Wurzgarten	23	159.16
6.95	Waldracher Meisenberg	1	6.95
7.85	Bernkasteler-Badstube	12	94.20
8.68	Serriger Vogelsang	3	26.04
12.35	Cote Rotie	5	61.75
12.56	Piesporter Goldtropfchen	14	175.84
12.85	Wehlener Sonnenuhr	12	154.20
13.95	Crozes-Hermitage	11	153.45
14.80	Chateau Lascombes	15	222.00
15.32	Hermitage	10	153.20
15.85	Chateauneuf-du-Pape	6	95.10
20.50	Les Hervelets (Fixin)	12	246.00
21.89	Taittinger	2	43.78
24.56	Moet & Chandon	47	1154.32
25.90	Piper-Heidsieck	3	77.70
26.85	Mercier	5	134.25
35.00	Laurent Perrier	0	0.00
35.90	Chateau Palmer	18	646.20
45.95	Chateau Haut-Brion	3	137.85
55.75	Chateau Lafite-Rothschild	4	223.00
58.90	Chateau Margaux	24	1413.60
58.96	Chambertin (Clos de Beze)	4	235.84
62.50	Chateau Mouton-Rothschild	6	375.00
85.80	Clos-de-Vougeot	3	257.40
98.50	Richeborg	4	394.00
105.50	Echezeaux	1	105.50
410.50	Romanee-Conti	18	7389.00

Figure 2: An inventory of wines, ordered by price-per-bottle. This was generated from the original table, displayed in Figure 1, by using the SORT command of T/Maker III.

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cypher between numbers in the same horizontal row if operators are put in the example row.

The only big surprise you may find with your first encounter with *T/Maker III*'s electronic spreadsheet is the order in which it performs computations. Rather than following a top-down or left-to-right sequence, it first performs all the addition top-to-bottom on each column—it finishes one column before advancing to the next one on the right. Then it does the subtracting, then the multiplying, and finally the division. Parentheses are not permitted. The manual states, "As we will see, fixing the order of calculation in this way does not pose difficulties for calculation, and, in fact, makes things quite easy to do." I have my doubts; however, because I have not yet worked long enough with *T/Maker III*, I will reserve judgment.

By looking at the screens, you've probably noticed that they show a lot of information besides the data you want to work on. Those columns of operators and example lines could make your printed spreadsheets look cluttered and, shall we say, unprofessional. *T/Maker III* allows a spreadsheet to be stored for future use with all the excess symbols scattered over it, so you can change entries later and recalculate, and it can be printed while adorned this way. But, the spreadsheet can also be "cleaned" and printed out or saved sans the example lines and operators.

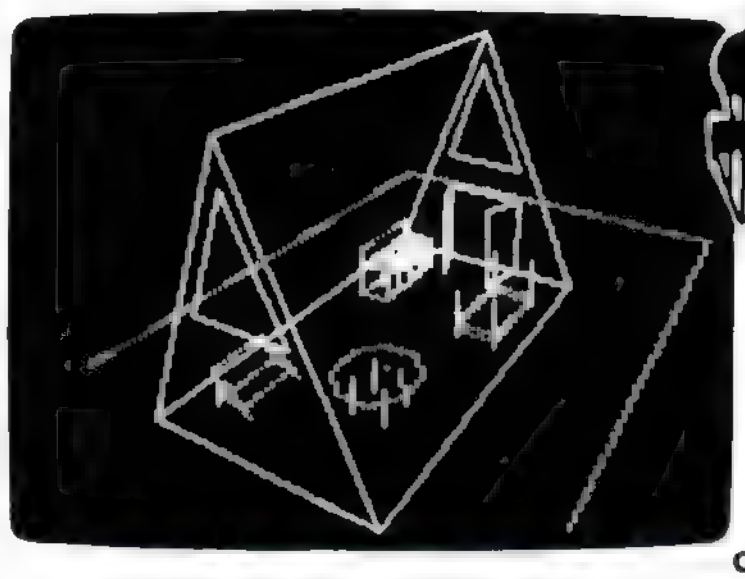
Because all information is put on the screen using the same editor as does text, you can decorate your calculations with explanations, obfuscating verbiage, or column and row captions; the editor also can supply lines of dashes, equals signs, asterisks, and slash marks to delineate tables. You are in absolute control of how your results will appear.

Unraveling Lists

List processing is what data base management is all about. By organizing and reorganizing facts and figures, you can suit your exact needs—alphabetizing, sorting by zip code, or just zeroing in on blue-eyed friends. *T/Maker III* makes data shuffling easy. Its organizational functions are not limited to mere lists, however. Anything within the grasp of the program's editor—text, spreadsheet, or table—is fair game to any of the available manipulations.

In its list processing functions, as with everything else, *T/Maker III* is line-oriented. It can eliminate all lines of a table that do not include desired key words or figures with the KEEP command, or it can delete the lines containing the key elements using the DROP command. Lines in a table—for instance, an address list or inventory—can be ordered alphabetically or numerically by using the SORT command, with the sorting keyed to any columns you choose (see Figure 2). Or the order of columns common to several lines can be rearranged by the ARRANGE command; this can move zip codes from the right side to the left side of a table. With the TALLY command, *T/Maker III* will

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count and report the number of rows in which a key element occurs. You can tally zip codes in your address list to determine your prime marketing areas or count up the answers on a batch of questionnaires.

Any number, or any word, phrase, or letter combination can be instantly located and brought to the top of the screen using the FIND command; or something can be substituted for the sought material using the REPLACE command. *T/Maker III* will compare two complete files and list any lines that might differ between them when you use the MATCH command.

The contents of a list can also be plugged into blanks in another file using the program's LOAD command. Not only does this permit mailing labels and personalized form letters to be generated from mailing lists, but LOAD also allows a prototype spreadsheet (or "mask") to be filled in with numbers from several files. Tack on the COMPUTE command and you have a powerful and automatic analytical tool.

T/MAKER III'S big advantage is the same as the Swiss Army knife—you only need one tool to do many chores.

Looking at the Graphics

Compared to the 16-color, any-kind-of-chart-that-you-want graphics software packages that are currently available for the IBM-PC, *T/Maker III* is a minimalist graphics program. It will draw only rudimentary bar charts using standard on-screen or printable characters.

T/Maker III will take numbers from one or more columns and draw from them a simple chart with horizontal bars. The numbers must have been entered using the screen editor in accord with the conventions of its spreadsheet function—an example line is mandatory.

Within those restrictions a limited amount of flexibility is allowed. Any printable or displayable symbols may be used for the bars; the bars may be of any width; the numerical data may be displayed along with the bar chart; and you can add on-screen adornment using the editor. In fact, the chart itself can be manipulated as if it were text—do with it as you please. The graphs can be printed with any printer, whether or not it has graphics capability (see Figure 3).

Although no one will buy *T/Maker III* strictly for its graphics capability, this limited feature may prove to be handy should the need arise.

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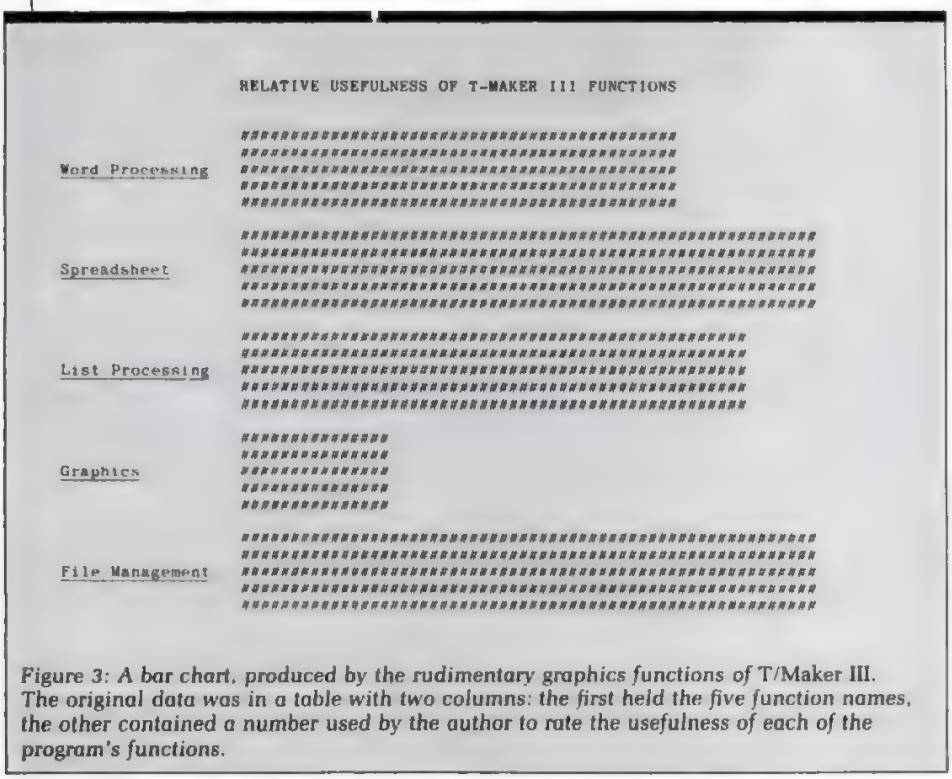


Figure 3: A bar chart, produced by the rudimentary graphics functions of T/Maker III. *The original data was in a table with two columns: the first held the five function names, the other contained a number used by the author to rate the usefulness of each of the program's functions.*

The Perfect Program?

T/Maker III is enigmatic. It is different from anything else I've ever encountered, and yet it is familiar in many ways. Once you have it running, you'll probably find it to be extremely versatile, with a happy combination of power and ease-of-use.

On the other hand, *T/Maker III* resembles most products that claim to be the electronic equivalent of Renaissance man. Although it handles many chores in a workmanlike manner, a dedicated single-application program could be found to perform any one of its tasks more elegantly. *T/Maker III*'s big advantage is the same as that of the Swiss Army knife—you only need one tool to do many chores. It lets you buy an entire system that can handle most everyday problems at a price less than that of a specialized software package that would offer only one of *T/Maker III*'s abilities. But you should always keep in mind that, although a Swiss Army knife will open any can of beans that you want, an electric can opener would open more cans faster (and do a neater job). */PC*

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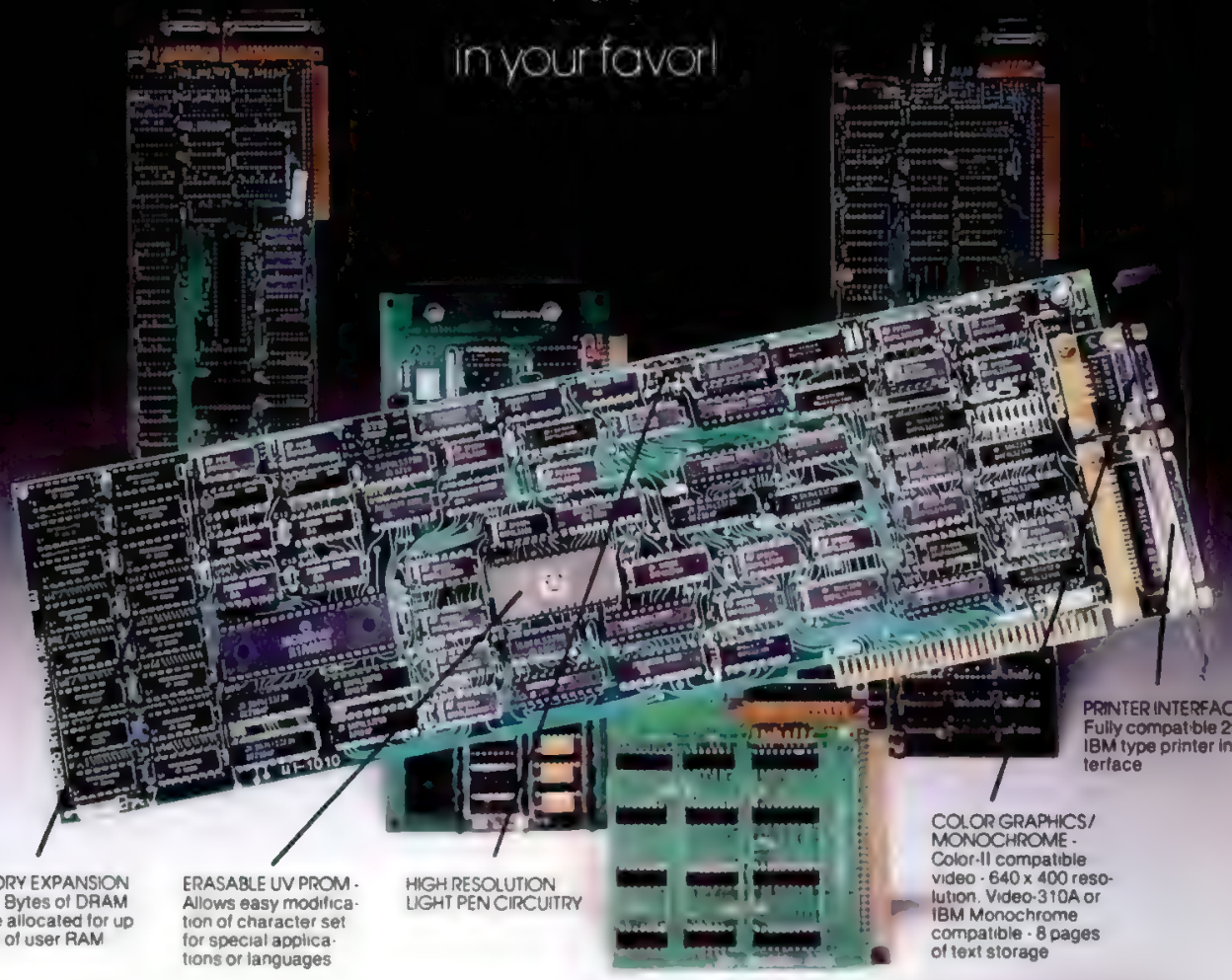
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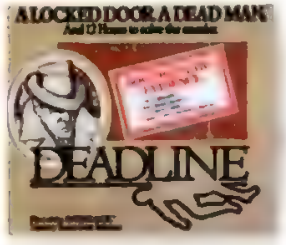
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HARDWARE/BILL MACHRONE

The IBM Color/Graphics Adapter can't do it all. Perhaps no single board can. But it's not true that "if you've seen the display from one board, you've seen them all."

Three Alternative Graphics Boards

You may have thought that IBM's pair of video display boards represented the state of the art in terms of capability and function. After all, the monochrome board features a high-resolution character set and character graphics, and the color board boasts its own unique set of graphics and text capabilities. Both use the sophisticated 6845 graphics controller chip. This sophistication, however, imposes certain limitations. The 6845 must be programmed into its different operating modes and requires some different support chips and circuitry if it is to do the best job in a given application. This is why IBM decided to produce two boards.

Even the IBM color graphics board fails to exploit the full potential of its own 6845 chip. This shortcoming explains the development of the aftermarket in graphics boards. Two of the three boards reviewed in this article—Colorplus from Plantronics/Frederick Electronics Corporation and the Orchid Graphics Adapter from Orchid Technology, Inc.— represent the state of the art in 6845 technology and push the chip to its limits. The third board, the Hercules Graphics Card from Hercules Computer Technology, doesn't use the 6845 at all, a courageous break from tradition in the PC arena. Each board has created its own niche in the marketplace. The Hercules bridges the gap between programs designed for the IBM color graphics board and PCs equipped with only the monochrome display. The Plantronics board wrings the last bit of color graphics performance out of the 6845. Orchid's contribution is a monochrome high-resolution graphics card, like the Hercules, but it is unique in the absence of a 6845. All three of the boards come with software packages that make it easy to use the full range of their capabilities.

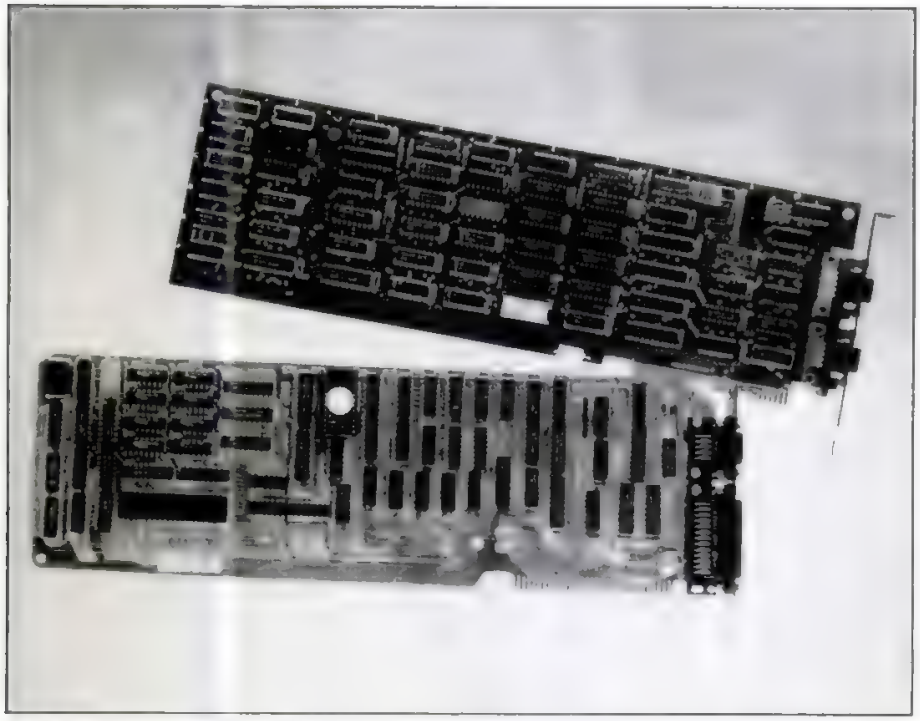
THE IBM COLOR graphics board fails to exploit the full potential of its own 6845 chip.

Hercules and Colorplus

The Hercules board replaces the IBM monochrome adapter. You use it in the same way as the IBM color graphics adapter, except that it hooks up to your existing monochrome display. It retains full compatibility with monochrome programs and provides dramatic high-resolution graphics as well. It responds to the graphic commands in BASIC via a patch program that appends itself to BASICA. The program intercepts the graphics commands and modifies them for compatibility with the Hercules card. Although the Hercules steals approximately 7K from available memory, the results are well worth it. Furthermore, the routines are available (at an extra $50) as a library that can be called from any of the compiler languages available for the PC.

We put the Hercules board through its paces in a standard PC and in a Columbia Multi-Personal Computer. It presented no problems in either case. The character set looked just as crisp as that of the IBM monochrome adapter. It also ran well with *WordStar* and other character-oriented programs. But the big difference came when we loaded BASICA and the graphics overlay. It was a pleasant surprise to see beautiful 720 × 340 graphics on our monochrome display. The BASIC commands for drawing and filling worked as promised. We selected a few games intended for the color board and found that they also worked well, although the graphics were a bit flat without color.

The Plantronics Colorplus board is quite distinctive in appearance. It is a two-layer board made of bright blue fiberglass instead of the usual green. Distinctive as it is, however, Plantronics may have a bit of an identity crisis. The parent company, Frederick Electronics, owns Plantronics,



Both the Hercules and the Orchid are monochrome boards designed to produce high-resolution graphics on a standard monochrone display.

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the manufacturer of PC+ products, as well as the Colorplus board (the name of the actual product). To simplify matters, we just call the board the Plantronics around the office; but it's difficult for the user to find a product image or a manufacturer's identity among all those names.

Although the manual claims that the board will fit in one slot, I thought the fit was too tight. Cooling could become a problem, and there seems to be potential for unwanted contact with a neighboring board. The visual performance of the board, however, is dramatic. It offers 320 × 200 resolution on two color planes and provides 16 colors. The quality is sufficient for presenting graphic images such as slides.

The software accompanying the Colorplus, called *Draftsman*, is exceptional. Using *Draftsman*, you can draw graphs or charts simply by answering questions and completing entries on the screen. It handles titles, legends, callouts, shading, and scaling. You can provide it with data from the keyboard or direct it to a *VisiCalc* DIF file or a BASIC comma-delimited file for input. It will use the data to complete a bar or pie chart or a line graph.

Draftsman allows you to draw and color virtually any polygon or group of polygons on the screen. It even allows you to "write" in longhand on the screen by moving the cursor and setting dots as you go. Perhaps the greatest advantage of *Draftsman* is that it allows you not only to direct the output to a standard Epson printer, but to a Hewlett Packard plotter such as the 7407 as well. We used the HP

THE VISUAL performance of the board is dramatic.

as the output device and the results were gratifying. *Draftsman* also tells you when to change pens, so what you see on the color screen will be what you actually get on the plotter.

Another interesting feature of *Draftsman* is its "slide show." In this mode, images are stored on disk. As you display each image, the next one is loaded from

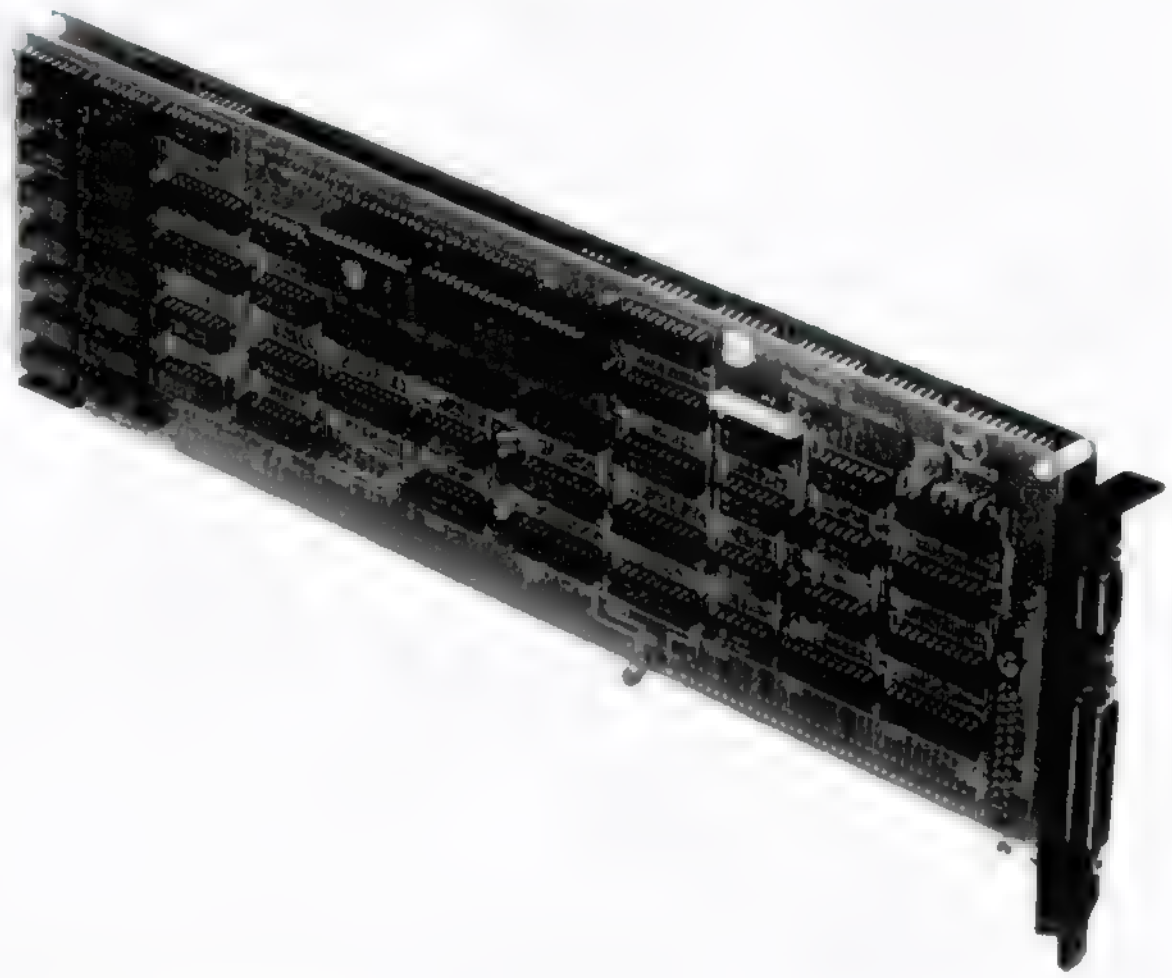
the disk into the alternate page of memory. You then receive the next slide instantly and *Draftsman* loads the following slide in the series while you are viewing the current one. It will also back up using the same technique. In a word: slick.

A Powerful Flower

Orchid, like the Hercules, is a monochrome board designed to wrest maximum graphics resolution from the standard monochrome display. As mentioned earlier, there is no 6845 CRT/Graphics controller on this board; all the functions are performed with small chips. This is not to say that it is lacking in technology, although Orchid seems to have a vested interest in guarding the secrets of how the board is constructed. In fact, the identification "branding" has been sanded off a number of the chips. The layout of the board is deceptively simple, as it is a multilayer construction instead of the usual two-sided printed circuit variety.

All tech snooping aside, the Orchid retains the high quality we have come to expect from the monochrome monitor's character set. It provides 720 × 350 resolution, the maximum available from the display. Best of all, it includes a software package called *Halo* that makes the graphics easy to use. *Halo* is a series of routines written in assembly language to support extended graphics. In addition to the more commonplace draw, flood, and fill functions, *Halo* makes it easy to move shapes around the screen, detect collisions, and pass one shape over or through another. It will manage the shape properly even if you steer it off the edge of the screen and back on again. *Halo* provides a number of sophisticated ways to fill or flood shapes and it will probably be able to support full color operations someday, though it is currently available only in monochrome. It even provides font manipulation instructions that allow you to put custom text on the screen and control its size and orientation. (Text can be vertical, upside down, backward, or in any orientation you wish.)

Halo is compatible with BASICA, as well as any of the compiled languages available on the PC. Although the documentation, we received was marked "preliminary," it was complete and provided good examples. Nevertheless, a few more illustrations would have helped. *Halo*



The Plantronics board offers 320 × 200 resolution on two color lanes and provides 16 colors.

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System Requirements

IBM Personal Computer
128K Bytes Memory

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also supports dumping a screen image to an Epson or an equivalent printer. One word of warning, however. Although you can store *Halo* images on disk, they are stored in a format imcompatible with the PC file system. *Halo* reads and writes full tracks by track number, which makes for very fast loading and unloading (no directory access time or sector allocation schemes), but you would be foolish to mix *Halo* images and PC-DOS files on the same disk. The best thing to do is to reserve one disk just for *Halo* images. If you don't follow this advice, you will probably destroy a good deal of software while trying to save *Halo* screens.

By contrasting the three boards, you can see why each has its own place in the market. Although there is some overlap in function between the Hercules and the Orchid, the accompanying software makes each unique. As for the Plantronics board, it is in a class by itself in terms of color quality. All three represent the top of the line in graphics boards and provide stiff competition for IBM. */PC*

Product Information

Hercules Graphics Card
Hercules Computer Technology
3200 Adeline St.
Berkeley, CA 94703
(415) 654-2476
List Price: $499; *Draftsman* (software) $50
Requires: Monochrome monitor, one disk drive.

Colorplus Graphics Board
Plantronics/Frederick Electronics Corp.
7630 Hayward Rd.
P.O Box 502
Frederick, MD 21701
(301) 662-5901
List Price: $475 (includes software)
Requires: RGB monitor, 128K, 2 disk drives.

Orchid Graphics Adapter
Orchid Technology, Inc.
1084 Hillview Dr.
Milpitas, CA 95035
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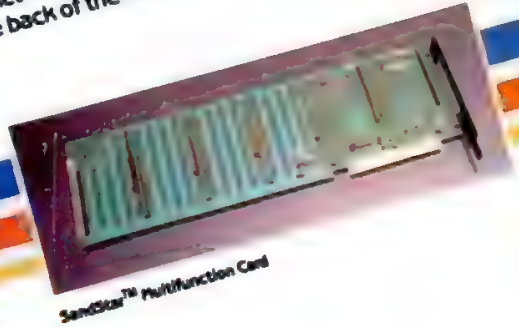
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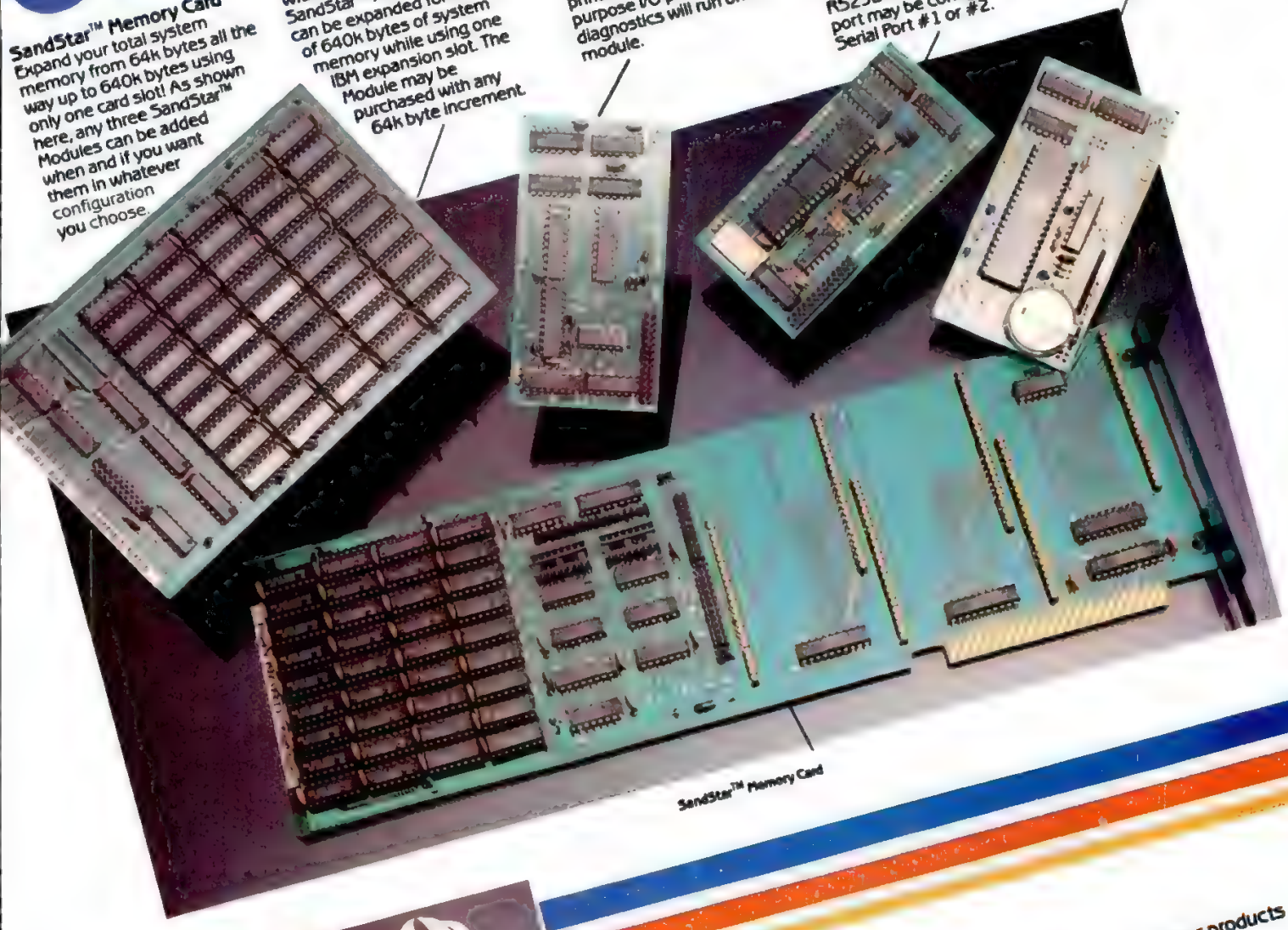
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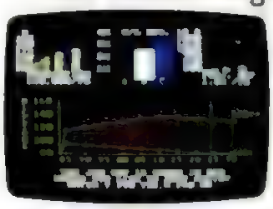
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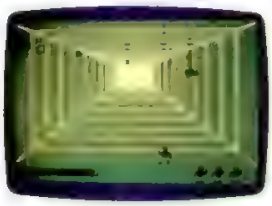
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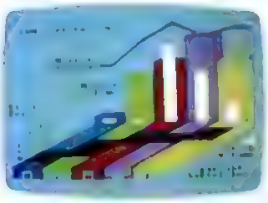
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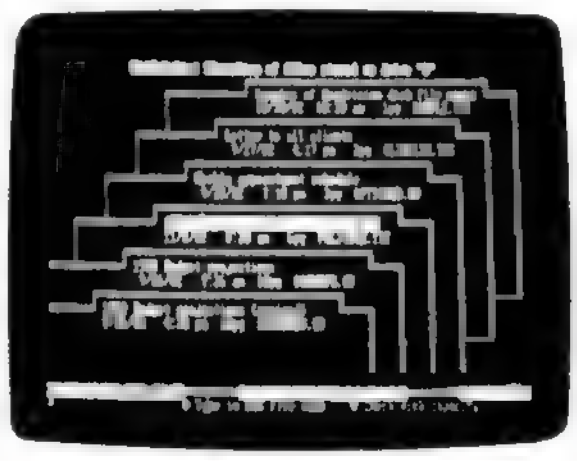
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About WORDVISION and our Pioneers:

WORDVISION for the IBM Personal Computer is the first in a line of "people-literate" low-priced programs from Bruce & James. Our Pioneer Corps is a group of more than 900 customers who bought advance copies of WORDVISION under a special offer: Any Pioneer who first alerts us to a problem we fix, or makes a suggestion we use, gets a full refund.

We've received 209 replies from Pioneers as of this writing, most of them thoughtful and thorough, many running to a half-dozen pages or more. The comments here are drawn from them. (The writers' names, addresses and complete comments are on file at our offices.)

There are many good reasons for WORDVISION's low suggested retail price, but compromise is not one of them. Visit your bookstore or program retailer soon to see what our Pioneer's liked. And what they suggested. (If you can't find a copy in your area, call 614/766-0110 for the name of your nearest dealer or to order direct by credit card.)

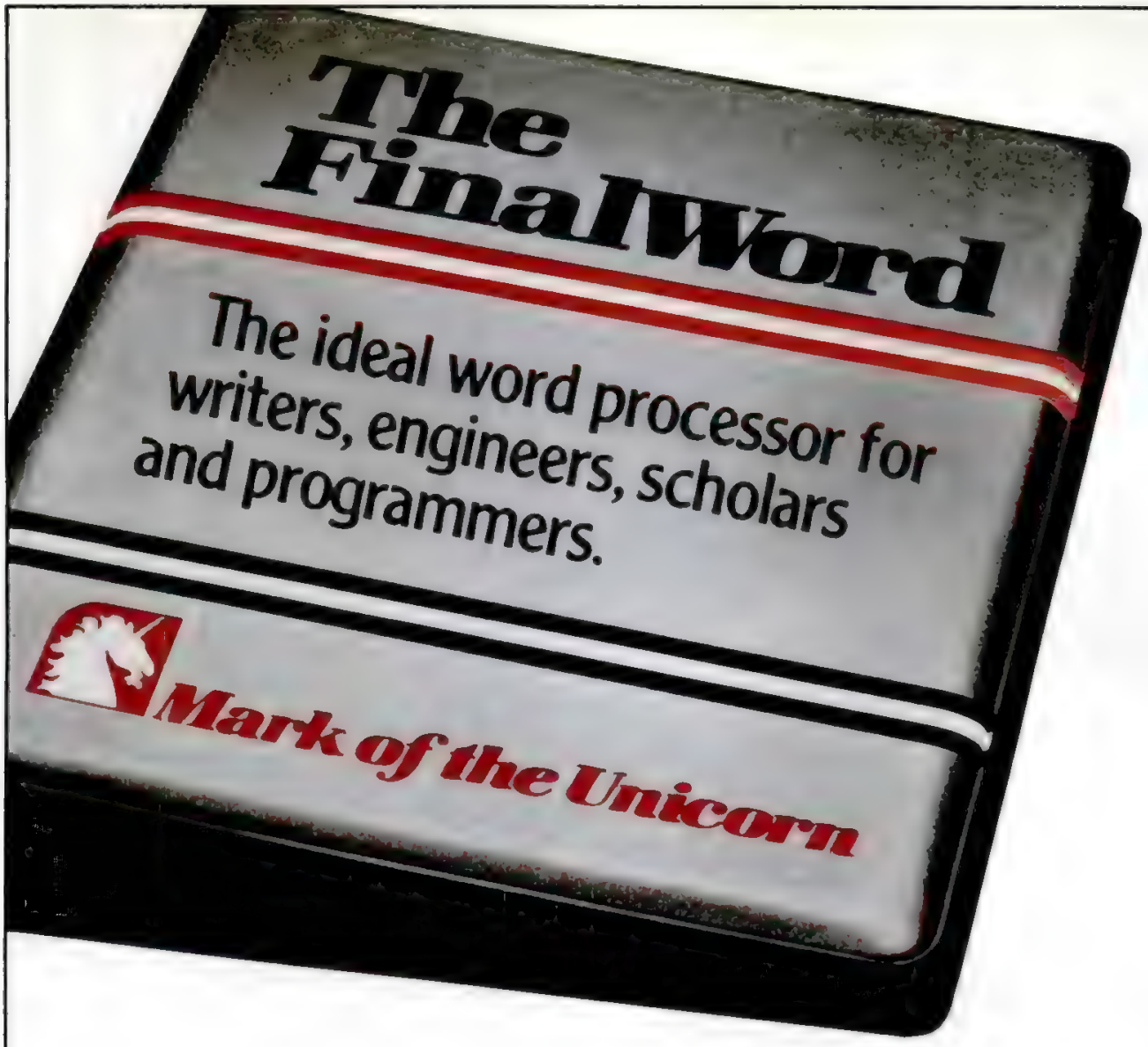
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PC Magazine, January 1983

"You'll wonder how you ever got along without it"
Software Retailing, March 1983

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CIRCLE 323 ON READER SERVICE CARD

An amphibious arcade favorite adapts well to life in the PC-environment. Other games offer you command of Fort PC and a graduate course in pinball wizardry.

Fun With Frogs And Flippers

This month we introduce the PC Magazine Game Rating. We award points, on a scale from one to six, for three categories: Fun value, which needs no explanation; Challenge, a measure of the skill required and the likelihood that a player will return to play again; and Graphics/Sound, an assessment of how well the game exploits the PC's possibilities.

Frogger
Sierra On-Line Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614
(209) 683-6858
List Price: $34.95
Requires: 64K; one disk drive; color/graphics adapter; RGB, color, or monochrome monitor; (joysticks optional).

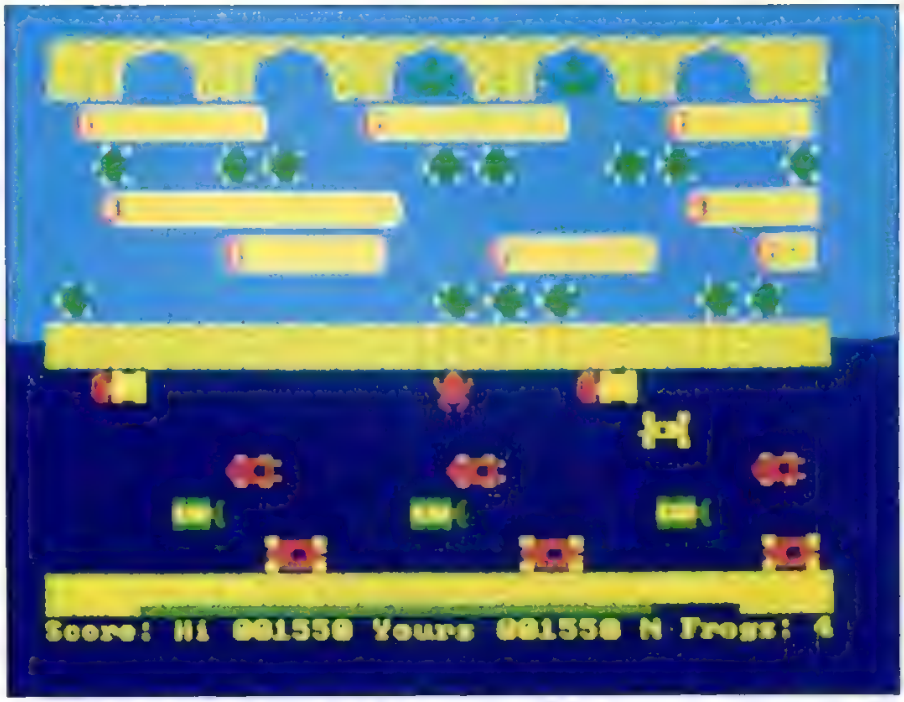
CIRCLE 693 ON READER SERVICE CARD

Why did the froggie cross the road? Heaven knows, there were rampaging trucks and out-of-control cars zooming every which way.

And then, why in the world would the froggie want to cross the river? Oh, sure, there are some hospitable logs on which to hitch a ride, and even a few friendly turtles willing to offer a floating platform. But watch out—there are snakes on the logs and the turtles sometimes decide to dive below the water. And there are carnivorous otters and hungry crocodiles. All this to get to a lily pad on the other side?

Whew! It's exhausting just to think about it. And think about it you will when you let Frogger into your home. This is a first-rate translation of an arcade favorite, complete with music, sound effects, and carefully crafted graphics. On an RGB monitor, the display is stunning, with action on every part of the screen. The game is also playable on a monochrome monitor attached to the color/graphics adapter board.

The point of the game is to maneuver your frog from the bottom of the screen to one of five lily pads at the top. You have to zig-zag between five lanes of traffic in the



At this point in Frogger, the red frog is about to hop off the highway onto the river bank. Can he reach a lilypond on the other side?

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The EXPLORER 88-PC STARTER KIT includes a mother board, memory/I/O board, all components needed, sockets for IC's used, one 62-pin bus connector and complete assembly/test instructions. All you need is a soldering iron, solder, a power supply, and a standard RS232 terminal (Netronics has 2 low-cost ones to choose from).

Explorer 88-PC Starter Kit...$399.95 + 10.00 p&i

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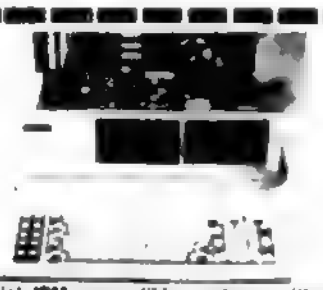
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CIRCLE 386 ON READER SERVICE CARD

first challenge; the traffic alternates direction and moves at varying speeds. Halfway across the screen, your frog reaches the river bank. Here you must arrange to have your frog jump onto passing logs and turtles en route to the lily pads.

The game is by no means easy. It should appeal to all age levels. And perhaps best of all, it is not a shoot-em-up or a

THE ZIGS AND zags of the frog are accompanied by a nice little hopping sound.

beat-em-down game. The zigs and zags of the frog are accompanied by a nice little hopping sound; a mishap with a truck yields a splat noise, and a bounce into the river produces an audible splash. Frogger even has its own theme music to accompany the frog's first appearance on the screen, transitions to higher levels of play, and his final passing. I played the game enough times to get tired of the music pretty fast, and was happy to find I could dispatch it with the F7 function key.

The game can be played from the keyboard—with user selectable keys for up, down, left, and right—or from a joystick. I much preferred playing from the keyboard, which had considerably faster action. I defined the movements to be directed by the up, left, and right arrows on the keypad, with the space bar ready for beating a froggie retreat.

The game can be paused during play, the background and foreground colors can be changed at any time, and there are three levels of play: normal, advanced, and expert. The program is copy-protected and uses its own operating system; I was able to run the program on the Compaq portable as well as on the IBM PC.

Frogger appeared to be well-constructed, with two minor exceptions. The registry of high scores seemed to occasionally overlook a new record, for reasons I could not discern. Also, the transition from the high score board into a new game sometimes took repeated punches of the escape and return key.

That notwithstanding, a hopping good



If four soldiers reach the ground unharmed, they can plant a bomb to blow up your gun turret in Paratrooper.

time will be had by all. Frogger has a leg up on most of the other arcade games for the PC.

The PC Magazine Game Rating for *Frogger*:

FUN:	4.5
CHALLENGE:	4.5
GRAPHICS/SOUND	5.0
TOTAL SCORE:	14.0

Paratrooper
Orion Software, Inc.
P.O. Box 2488
Auburn, AL 36830
(205) 887-9721
List Price: $29.95
Requires: 48K, color/graphics board, color or monochrome monitor, (joystick optional).

CIRCLE 692 ON READER SERVICE CARD

John Wayne, meet Charlie Chaplin. *Paratrooper* is a shoot-em-up game at "Fort PC." You are commander of a fixed gun emplacement with a moveable turret. Overhead come helicopters dropping paratroopers—first one at a time and then in swarms. You've got to shoot down the helicopters or failing that, massacre the helpless paratroopers as they fall to the ground. Oh yes, there are jet planes with bombs, too.

If four troopers land on the ground unshot, they creep toward your emplacement. Crouching at the base of the gun, they scurry to stand on each other's shoulders in order to reach up and plant a bomb to destroy your gun.

FOUR TROOPERS scurry to stand on each other's shoulders to reach up and plant a bomb to destroy your gun.

This is a well-executed but unexceptional game. The graphics (with very pretty explosions and cute little parachutes) and sound (including the stirring strains of Bach's Toccata and Fugue in D Minor at boot-up) are quite nice, but *Paratrooper*

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1900 Pickwick Ave., Glenview, IL 60025
CIRCLE 373 ON READER SERVICE CARD

quickly loses its appeal after a dozen or so plays. I found it frustrating that there was no way to kill off the troopers once they land on the ground—the gun is fixed in place and cannot fire below an angle of about 50 degrees.

Orion Software is also the distributor of *PC-Man*, a well-done remake of *Pac Man*. This company obviously has the ability to produce fine products—but it could use a healthy infusion of creativity and originality.

YOU'VE GOT to shoot down the helicopters or massacre the helpless paratroopers as they fall to the ground.

The PC Magazine Game Rating for *Paratrooper*:

FUN:	3.0
CHALLENGE:	2.5
GRAPHICS/SOUND:	4.5
TOTAL SCORE:	10.0

Night Mission Pinball
SubLogic Corp.
713 Edgebrook Dr.
Champaign, Il 61820
(217) 359-8482
List Price: $34.95
Requires: 64K, color/graphics adapter, color or monochrome monitor.

CIRCLE 691 ON READER SERVICE CARD

I now know what it is like to unpack a child's sandbox toy, only to find a 62-page technical manual that begins with, "Turn on power to oscilloscope."

Night Mission Pinball is not a mere pinball game. It is also not another "Bombing Run Over Berlin." So much for the easy part of figuring out this game. This program is a strange combination of game and graduate physics lesson. The four-page instruction manual is straightforward enough, presenting a way to start playing the game with its variables set to default values. But then there's an 18-page "adjustment manual" which offered me the power to set any or all of 36 different parameters for the game—and I probably missed a few adjustments.

I should have expected this devotion to detail from Bruce Artwick, also the designer of the extremely popular *Flight Simulator* game (distributed by Microsoft). But *Night Mission Pinball* is still a pinball game at heart, and at first I felt I was the victim of massive overkill.

Here are some of the simpler variables left open to the user:
BALLS PER GAME—from 1 to 99. A reasonable choice.
FREE GAME SCORE—from 0 to 999,999. One way to extend or shorten the game time.
BALL SPEED—Again, a reasonable kind of adjustment.

Now, you may have noticed that these three variables are often the ones automatically adjusted by programs that allow the user to select novice, intermediate, and expert levels of play. But Artwick did not stop there. Try a few of these variables:
FORWARD INCLINE—To put it another way, the amount of gravitational force.
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NIGHT MISSION Pinball is a strange combination of game and graduate physics lesson.

LEFT V THRESHOLD, VELOCITY X, VELOCITY Y, AND RIGHT V THRESHOLD—Control over the kick given the ball by the "impulsers" located in the pinball chutes.

And, yes, this computerized pinball machine even expects—and reacts to—body english. Bumping the machine by striking keys on the left and right sides of the keyboard can jostle the ball on the screen. Bumping too hard, as every pinball wizard knows, can result in a game-ending "TILT." *Night Mission Pinball*



Night Mission Pinball *has little to do with flying, but lets you do a lot to change the odds of pinball.*

allows you to set the program's sensitivity to tiltable offenses.

Well, as I said at the beginning of this review, I was at first mystified by the purpose of this product. I'm still not sure why the company felt the need to add the "Night Mission" element. In playing the game I never really paid any attention to the static picture of the bomber on the right side of the screen or the military notes appended to the pinball board: the

A MINOR change in the mathematics of a game can have vast effects on its playability and challenge.

ball chutes and tunnels are called the "bomb release line" and some of the various extra-point lights on the screen are identified in the manual as being cities to be "bombed." Why must everything become a shoot-em-up?

However, I eventually began to look at this product in a different way. I saw it as an educational tool that allows the user to understand a bit about the complexity of a video game. You won't learn how to program, since the game is written in copy-protected assembly language, but by experimenting with the variables you should be able to understand a bit about how a minor change in the mathematics of a game can have vast effects on its playability and challenge.

The game itself is not very challenging, and not all that much fun after a couple of playings. In fact, I felt that *Flipperball* (reviewed in *PC Magazine* Volume 1 Number 12) was a better representation of the physics of a pinball machine. *Night Mission Pinball*, though, should have great appeal to the tinkerer.

Night Mission Pinball:

FUN:	3
CHALLENGE:	3
GRAPHICS/SOUND:	5
TOTAL SCORE:	11

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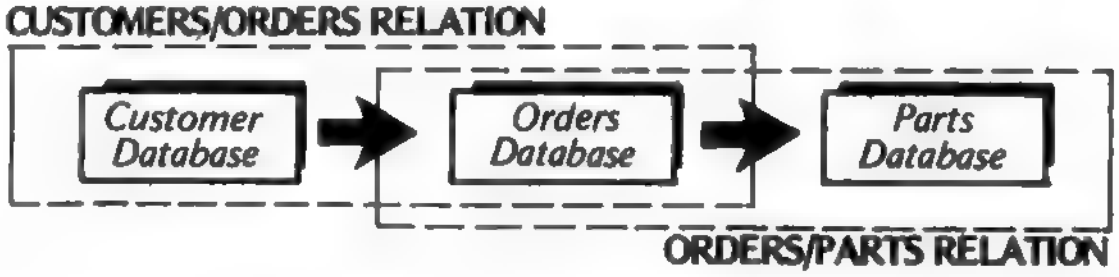
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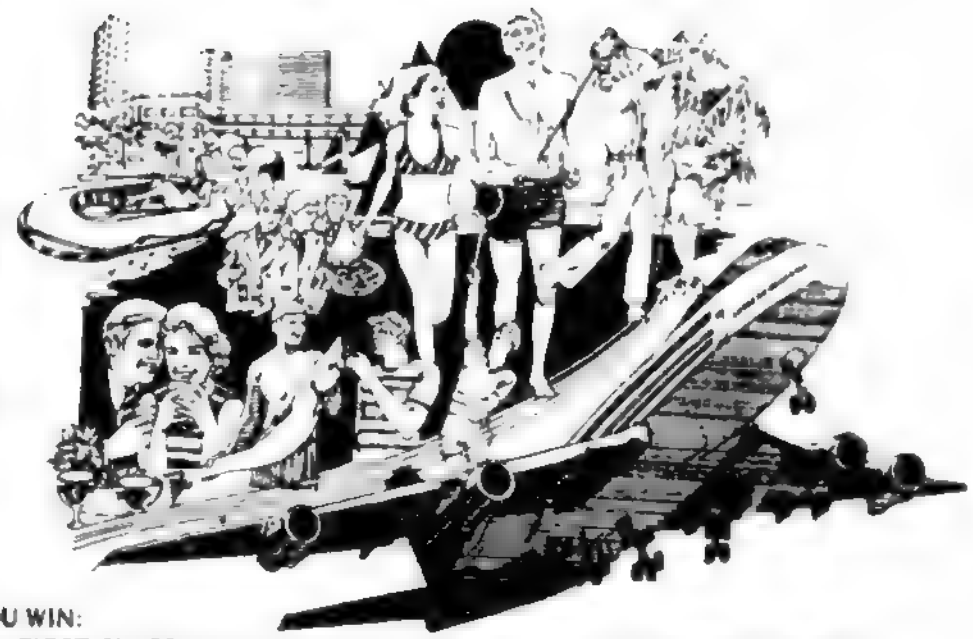
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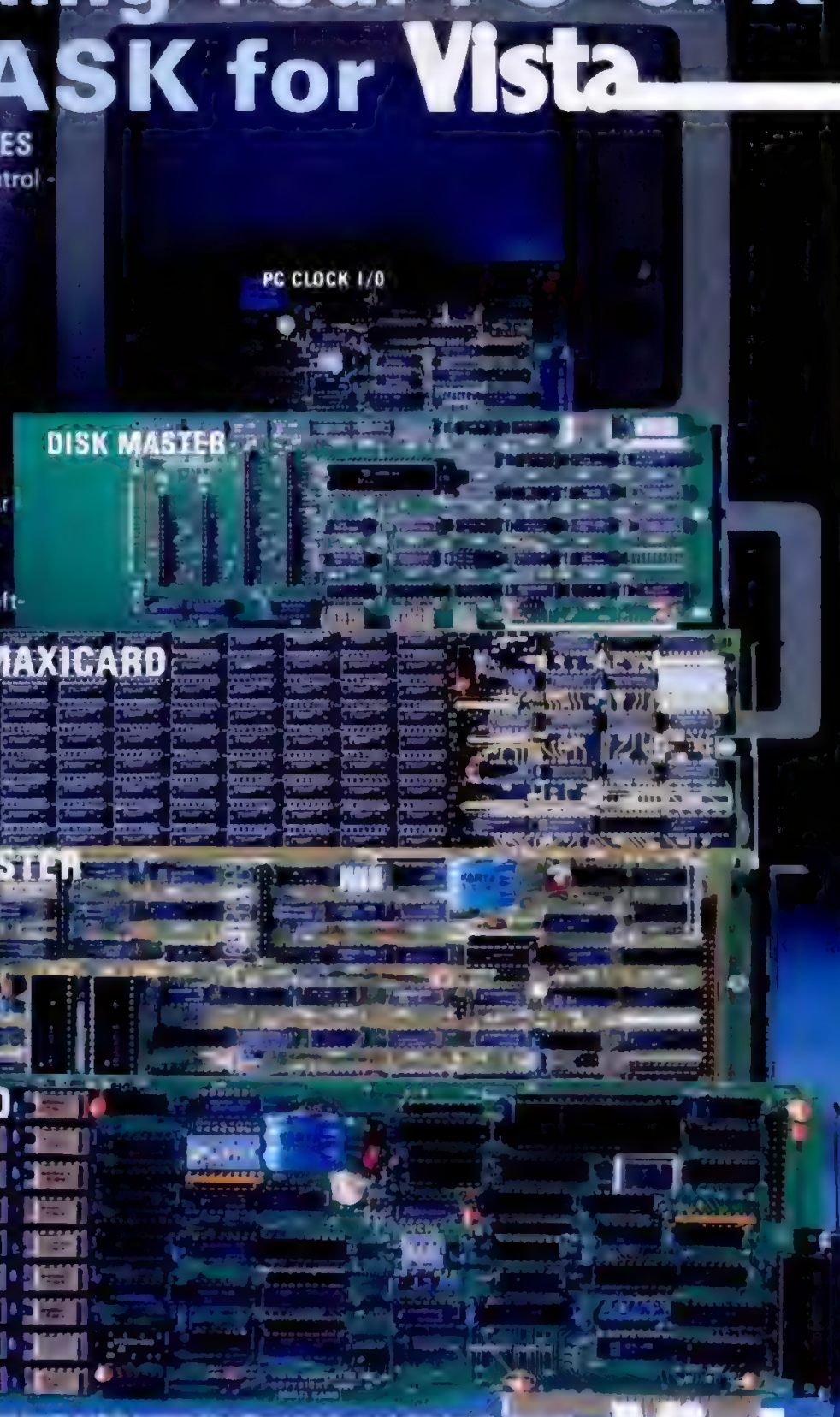
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2. Chart of Accounts with summary dollar amounts
3. Chart of Accounts with prior year comparisons
4. Daily Transactions Report
5. Itemized Monthly Transactions
6. Balance Sheet
7. Balance Sheet with prior year comparison
8. Income Statement
9. Income Statement with prior year comparison
10. Departmental Income Statement(s)
11. Departmental Income Statement(s) with prior year comparison
12. Detail report for individual accounts
13. Trial Balance Statement

Accounts Receivable

1. Daily Transactions Report
2. Invoices (with or without pre-printed forms)
3. Statements (with or without pre-printed forms)
4. Summary Aging Report
5. Detailed Aging Report
6. Itemized Monthly Transactions
7. Detailed Cust. Activity Report
8. Summary Cust. Account Report

Accounts Payable

1. Daily Voucher Report
2. Daily Credit Report
3. Checks with Detailed stubs
4. Check Register
5. General Ledger Transfer Report
6. Cash Requirements Report
7. Transaction Register
8. Open Voucher Report
9. Aged Payables Report
10. Detailed Vendor Activity Report
11. Summary Vendor Account Report

Payroll

1. Federal Tax Tables
2. State Tax Tables
3. Payroll checks with stubs
4. Payroll Check Register
5. Monthly Payroll Summary
6. Quarterly Payroll Summary
7. Gen'l. Ledger Transfer Report
8. Detailed Employee File Listing
9. 941 Worksheet
10. W-2 Forms Printing

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AR	400 Customers	800	1,600	7,000
AP	400 Vendors	800	1,200	7,000
PR	400 Employees	—	—	—

IBM

SYSTEM REQUIREMENTS

Requires either CP/M® or MS-DOS (PC-DOS), MBASIC for CP/M®, BASICA for MS-DOS; 56K to 64K RAM; 2 Disk Drives or Hard Disk; at least 200K of mass storage (we recommend more); 132 column printer (an Epson MX-80 or similar printer with compressed mode is acceptable); call for exact requirements on specific systems.

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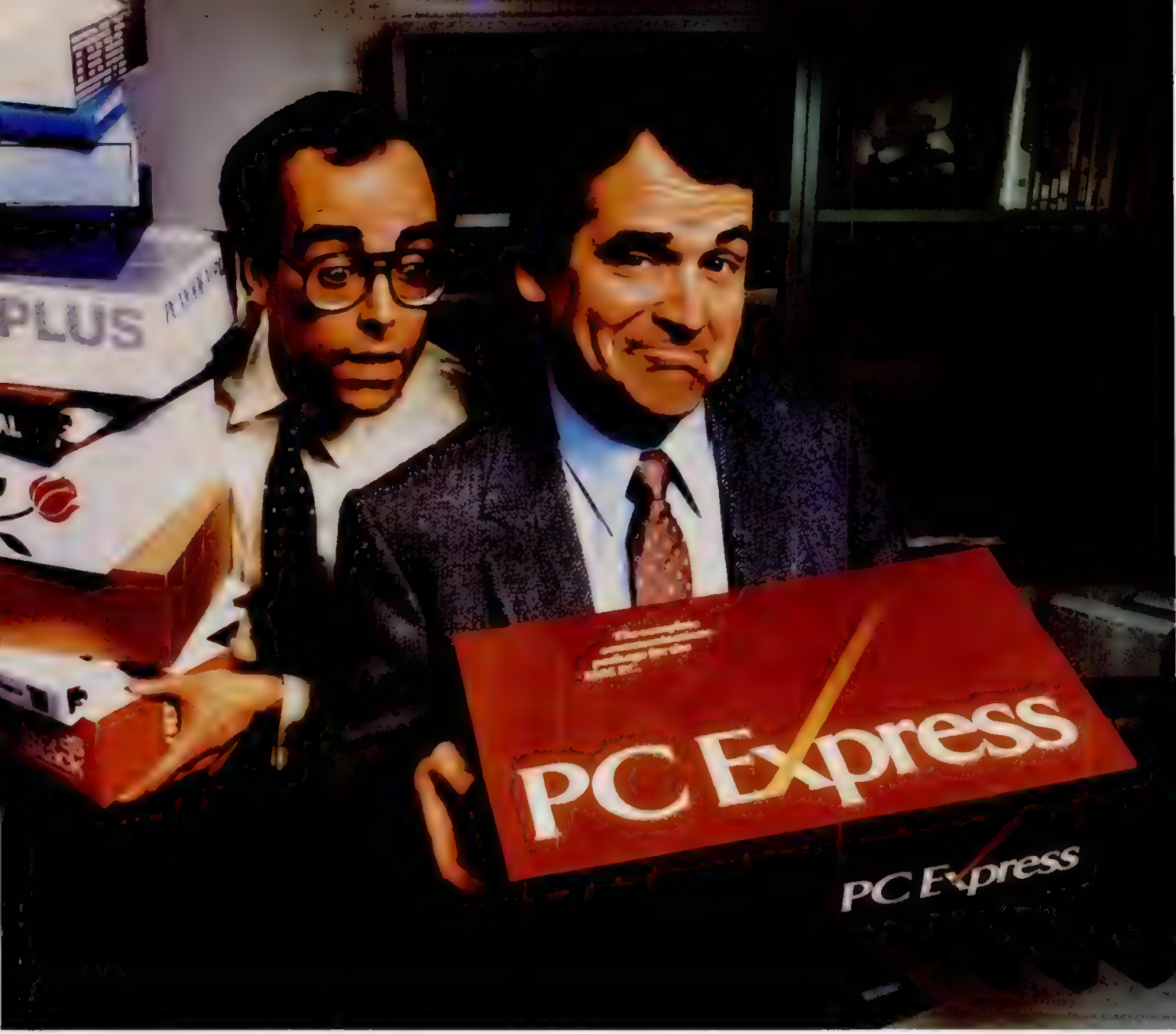
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CIRCLE 249 ON READER SERVICE CARD

On-line services can connect your PC to many specialized databases. If one can satisfy your information needs, it'll be worth your time and money.

The Database Connection

You've known about The Source and CompuServe for a long time, and you've heard about computer bulletin boards. But you think there ought to be more. The Source and CompuServe, with their CB chatter and their shop-at-home services, are all very nice for hobbyists, but you've bought a PC! You're a professional or a manager, and you've bought a working computer, not a toy. Are there any online services out there for you?

The answer is a qualified yes. And the principal qualifications are, first, that the other services out there are not cheap, and second, they're not something you're likely to want to merely dabble in. They require some commitment.

These other on-line services generally call themselves "search services." Their job is not to collect and create databases, but to make them available to users. There are two basic types of databases and, therefore, two different types of on-line services.

Word-oriented services maintain databases that are primarily text; their software makes it possible to locate the pieces of text you need. Dialog, BRS, SDC, and QL Systems are the largest of the bibliographic on-line services; VU/TEXT, Info Globe, and NewsNet are other interesting full-text services.

Number- or computation-oriented services are more akin to the big time-sharing service bureaus. Their databases are usually sets of numbers; their software lets you not only retrieve numbers, but manipulate them as well. The largest of the number-oriented services are I.P. Sharp, Chase Econometrics, and General Electric Information Services.

They really do have heaps of information. Dialog, the biggest of the services, gives you access to 120 billion bytes of information, organized into 80 million records and 170 different files. A full-text newspaper database like InfoGlobe grows by a million bytes a day, and InfoGlobe has 6 years' worth of newspaper text on line. All this—and more—can be yours if

Thank god



Business at Bundtweiller Brass Beds is booming! And now that Friday's here to help out, I've got everything under control.

Friday's the revolutionary new microcomputer information management system from Ashton-Tate, the people who invented dBASE II.™

It came in Tuesday, and it took me almost no time at all to get the hang of it because Friday works *with* me, not against me. I've already turned stacks and stacks of paper files into much more efficient "electronic files." And it's so easy to use that even Mr. Bundtweiller can do it.

So now, no matter what Mr. Bundtweiller needs to know—no matter when he needs it—he or I can find it in seconds.

The names and commissions earned by our top 25 salesmen since January 1st.

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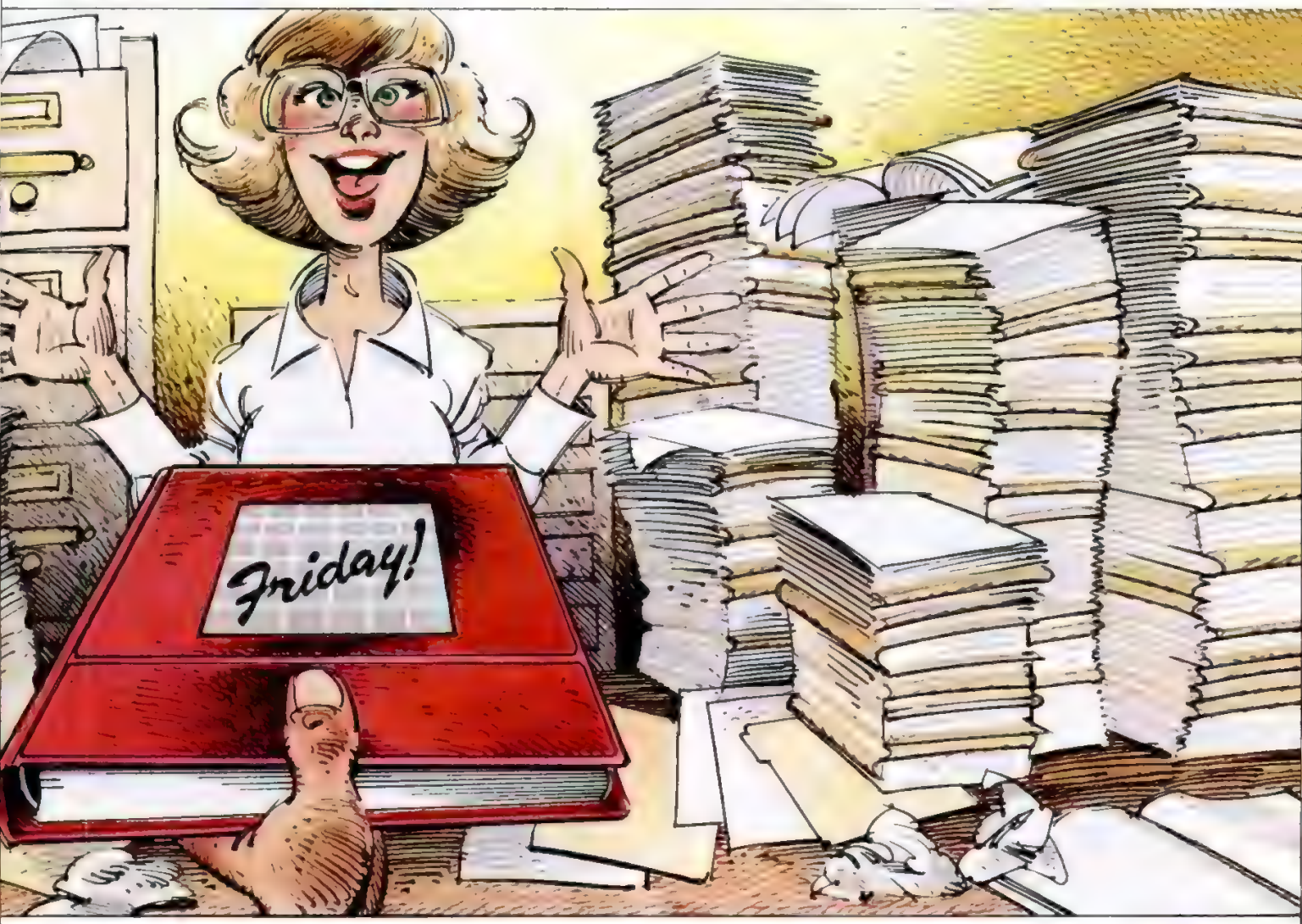
Or the special report for the Board of Directors meeting this afternoon. Mr. Bundtweiller forgot to tell me about it until just before lunch, but Friday and I got it done in no time at all. It looks gorgeous!

Friday even knows how to keep private or confidential information to itself unless I ask for it using a special password.

Friday's helped me say goodbye to paper shuffling forever. It's terrific for inventory and invoices and paychecks and input screens and reports. It works with dBASE II™ and 1-2-3[1] and Wordstar[2] files. And the way it handles mailing lists and labels is just fantastic.

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you have a PC, a modem, the requisite terminal software, a few account numbers and passwords—and quite a bit of time, money, and commitment.

(For details on modems, communications software, communications networks, and The Source and CompuServe, see the Communications issue of PC, Volume 1 Number 9. Also, the accompanying article, "Software for Searching," describes two software packages for your PC that are specifically designed to make searching easier.)

Heaps of Data

Once you're connected to an on-line service, what have you got? You've got a virtual mountain of data, organized into what are interchangeably called "files" or "databases," and you've got a selection of "search software." The search software is the software with which you interact and which helps you dig the information you want out of the database. The same process operates with all the databases offered by a particular search service, but then each service uses a different setup—Dialog's is different from InfoGlobe's, which is not the same as BRS's.

You've bought a working computer, not a toy.

To understand how searching works, it helps to see the way word-oriented databases are organized. Each database consists of a large collection of records. A record might be a newspaper story, or it might be a short biography. However, in most cases, with the existing on-line services, a record is a bibliographic reference, similar to those in a library card catalog file. (Most of the larger on-line databases started out as tools for librarians.) Here's a typical record, taken from the Microcomputer Index file on Dialog:

```
032418 8202137
   PL/I for limited resource computers
   Kildall, Gary
   Microsystems, Jan/Feb 1982, v3 ni p28-29, 2 pages ISSN: 0199-7955
   Languages: English
   Document Type: Article
   Geographic Location: United States
   Presents a reprint of an article taken from the NCC 1981 Proceedings that discusses the PL/I-80 implementation of the PL/I language that runs under the CP/M operating system. The author is the designer of the CP/M operating system.
```

Software For Searching

Programs will soon be available to help you develop and save effective search strategies.

SearchMaster
SDC Information Services
2500 Colorado Ave.
Santa Monica, CA 90406
(213) 820-4111
List Price: Not available
Requires: 64K, PC-DOS 1.1, one disk drive (two recommended), modem (Hayes Smartmodem needed for autodial), (printer recommended).

Communications Plus (C+)
Data Trek, Inc.
121 West E St.
Encinitas, CA 92024
(619) 436-5055
List Price: $495
Requires: 64K, CP/M-86 (version for PC-DOS is being prepared), one disk drive, modem, (printer recommended).

To turn your PC into a terminal for work with on-line services, you need terminal software.

Basically, terminal software sends what you type on the keyboard out through your computer's asynchronous port and sends what comes in through that port to the screen. A rudimentary program of this type, called COMM.BAS, came with PC-DOS when you bought your PC.

The next level of terminal software allows you to record your conversation with a remote computer and transmit or receive files directly to or from a disk. If you're going to do a lot of on-line work, it's worth investing in a program that allows you to do at least this much; its cost needn't be too high, and it will make life much easier. Be sure—be absolutely sure—that whatever software you have includes the "Break" function. On-line services make extensive use of the break function, and if you don't have it in your software, you can't, for example, stop the 30-page display instruction that you gave by mistake.

A recent arrival on the communications software market is software especially designed for communications with on-line database services. Two such packages, still undergoing final development, testing, and manual writing, are *Communications Plus (C+)* by Data Trek of Encinitas, California, and *SearchMaster* by SDC. (That's the same SDC that offers the on-line service, but its software isn't tied to its service.)

Like a number of other communications software packages, both *C+* and *SearchMaster* allow you to create a file of search services, which includes their phone numbers, your account number and/or password, and the specific communications technicalities for each service. Once this file is set up, by making a simple menu choice, you can be connected to the service you want.

Scripts for Searches

What makes these packages especially useful for database searching is the assistance they give you in developing "scripts" for your on-line interactions. With database charges running to $1 a minute or more, you want to think through your data request well in advance of signing on and compose your transactions in advance.

Descriptors: PL/I; Languages: CP/M

This record describes an article in the January/February 1982 issue of *Microsystems* magazine, written by Gary Kildall, entitled "PL/I for Limited Resource Computers." The brief description starting with "Presents a reprint. . ." is an abstract of the article. This record is divided into fields: record numbers, title, author, publication and reference, language, document type, geographic location, abstract, and descriptors.

Most of the bibliographic databases offered by the "big-three" services—BRS, Dialog, and SDC—are structured roughly like the one shown, with similar fields. But each database has its own peculiarities. For example, Dialog's Legal Resource Index includes a "Jurisdiction" field, referring to the state in which a legal article is relevant. The Newspaper Index offered by SDC doesn't offer an abstract of the article indexed, only the title, name of the newspaper, and a set of index terms.

Full-text databases, on the other hand, include the entire text of the article; these services are still rare. But more and more of them are appearing, as the interests of database users move out of the library card catalogs and into the world in general.

THE SEARCH software helps you dig the information you want out of the database.

Seek and Find

What can you do with these records? Typically, you can search them out and you can print them on your terminal and printer, or on the service's printers. Sometimes, you can place an order for a copy of the published article, but count on 1 to 2 weeks for delivery.

Searching and printing the records is the job of the on-line service's software. The search software allows you, in a few seconds, to locate every record in the file that contains any designated word or combination of words.

Here's an example illustrating the search process. You're a writer who wants to go to the National Computer Conference. You intend to convince an editor that interesting things happen there, so he will pay for your trip. You think it would be useful to show him evidence that other media take the NCC seriously, so having references and copies of articles about last year's NCC (held in Houston) would be helpful.

Assume you're using the Dialog search service. To start with, you look through

Say you wanted to do a search for information about the National Computer Conference, and you decided to use the strategy described in this article. You'd jot down the following set of commands to Dialog and hope that your search would go as planned.

```
begin 233
select ncc
display 1
begin 47
select computer or computers
select s1 and houston
display 1
```

With both C+ and *SearchMaster*, you could key in this list of commands before you go on-line. You would choose the service with which you wanted to communicate and work your way through the script you'd keyed in.

Communications Plus

With C+, the script appears on the top half of your PC's screen, the ongoing conversation with the database scrolls on the bottom. Hitting the Tab key sends the next line of script to the distant computer.

You can also alter the lines before you send them if you decide you want to improve your script. For example, if your "computer or computers" instruction turned up only five references, you might choose to skip the "Select s1 and houston" step, and display the first five references immediately. You can also skip back and forth between editing the script you've developed and interacting directly with the on-line service.

C+ also features a "think key." Because some databases are much more expensive than others, you want to be connected to a cheap one if you want to sit back and take time to think a bit. Hitting one of the PC's function keys causes C+ to send the on-line service the necessary commands to quit the database you are working in and connect you to the cheapest one around.

SearchMaster

SearchMaster goes a step further in developing scripts. Not only can you develop the script for a particular search, but you can develop general scripts, with fill-in-the-blanks capability. For example, say you frequently search for information about particular companies, and you've learned what three databases are the most pertinent and know exactly how to specify your search to weed out reports about the companies' annual picnics. You can save that strategy in a form in which the company name is replaced as a variable name. When you instruct *SearchMaster* to run the search, it will prompt you for the company name and any other information specific to this search; then it will do the search quickly and without any further intervention.

The script can present menus and prompt for choices from among them, and it can turn control back over to the user at any time. It can't, however, branch in response to the data it has retrieved from the database; that is, you can't tell it to follow one strategy if it retrieves 500 or more references, and another strategy if it locates fewer than 500.

Customized Searchs

And, of course, this raises the possibility of professionally-programmed searches. SDC may soon be in the business of developing and selling scripts for *SearchMaster*. You could buy, for example, a political personality search script for InfoGlobe or a corporate data script for Dialog and run it on your *SearchMaster*-equipped PC. SDC expects that other organizations will write and sell scripts that run using *SearchMaster*. If you used their software, you'd never have to know about developing search strategies and the like as long as your needs were constant and predictable. —J.H.

From Author to Reader Via Databases

Publishers and search services are among the parties involved in making a database available to you.

Data finds its way to your PC's screen through a chain of intermediaries.

At the far end of the chain, as seen from your point of view as a database user, is the original author's text: a magazine article, a book, or a newsletter. In the case of a full text database, such as InfoGlobe or the VU/TEXT service, the chain is short: the corporation that pays the writer and publishes the printed version also loads the same text onto a computer and sells you access to it through a database. In most cases, though, you'll get a longer chain of middlemen.

Take, as an example, an article in *Fortune* magazine on automobile unions. *Fortune*'s full text is not available except on paper at the moment. But there's a magazine called *Management Contents*, published in Northbrook, Illinois, that consists of the tables of contents of 375 different business periodicals and indexes to the articles.

Management Contents' publisher, using the same information it needs to compile its print version, also produces a computer-readable product. It consists of bibliographic citations and a brief abstract of each article, recorded on magnetic tape. Here's an example of the kind of information it records on each article:

```
- Ross, I.
- The New UAW Contract: A For-
  tune Proposal.
- Fortune, Vol. 105, No. 3, Feb.
  8, 1982, P. 40-45.
- Interview; Automobile-In-
  dustry; United-States; La-
  bor-Costs; UAW; Labor-Ne-
  gotiations; Competition;
  Cost-of-Living-Adjust-
  ments; Employee-Benefits;
  Japan.
```

This record is followed by nine lines that describe the article.

This magnetic tape is the raw material of a database; by producing it, *Management Contents* qualifies as a "database producer." But *Management Contents* doesn't sell access to its database directly to you. Instead it sells data to the search services that market it to you.

Management Contents sells its tape to all three of the largest search services—Dialog, BRS, and SDC—so you can get access to *Management Contents* if you subscribe to any one of the three.

When each of these search services receives the monthly *Management Contents* tape, it massages and reformats the information and adds the data to its *Management Contents* database. *Management Contents* is called "file 75" on Dialog, "MANAGEMENT" on SDC, and "MGMT" on BRS.

Then the search service sells it to you, along with the software necessary to search and retrieve the data you want from it. Using the *Management Contents* database costs you $70 per hour with SDC, $80 an hour with Dialog, and $75 an hour with BRS. Of each of these fees, approximately $40 is paid to *Management Contents* as a royalty on the database.

This is the most common path for a printed article: from author to print publication to indexing/abstracting organization (that produces the index in print form) to search service to end user. But there are instances in which one or more of these steps is skipped. For instance, some of the NewsNet newsletters exist only in their electronic versions; there is no print step in this case. Some of the indexes, such as ABI/INFORM, another service that covers business publications, have no print equivalent.

Sometimes the producer of a database will sell it to you directly, as well as through a search service: Chemical Abstracts Service is an example of this.

The royalty structure above—where the search service charges the user and pays a royalty to the database supplier—is also not fixed in stone. Some databases, primarily government-produced ones, are "sponsored"—that is, the producer pays the search service to provide the database. There may or may not be royalties that may or may not go to the producer. It all depends on how eager the producer is to have its data used. —*J.H.*

Dialog's list of databases, and you discover several that look interesting. For starters, there's the Microcomputer Index ("... guide to magazine articles from over 21 microcomputer journals ..."). Dialog also has the Magazine Index ("... covers over 370 popular magazines ...") and the National Newspaper Index ("... monthly updates ... provides front-to-back-page indexing of the *Christian Science Monitor*, the *New York Times*, and *The Wall Street Journal* ..."), which look useful.

You start with the Microcomputer Index. You sign on to Dialog and give it your password. Then you tell it to:

```
begin 233
```

(233 is Dialog's file number for the Microcomputer Index). Dialog confirms that you are connected to the Microcomputer Index, and you instruct it to:

```
select ncc
```

That is, select all records in the current file in which "ncc" occurs (use of capital letters doesn't matter in a search).

In a couple of seconds, Dialog responds with:

```
1 20 NCC
```

This tells you that set 1 (your first "select" request) consists of 20 records in which "NCC" appears.

With only 20, you could look at them all without too much trouble. You tell Dialog to:

```
display 1
```

meaning to start displaying set 1 on our terminal. Each of the 20 records displayed looks like the one above (for an article by Gary Kildall) and every one of the articles is on target. The sample record, however, illustrates one possible problem: That article referred to the NCC, without being about the NCC. If you'd gotten 200 NCC records, you would want a way to get rid of the ones like the example.

EACH database has its own peculiarities.

That was a successful search, provid-

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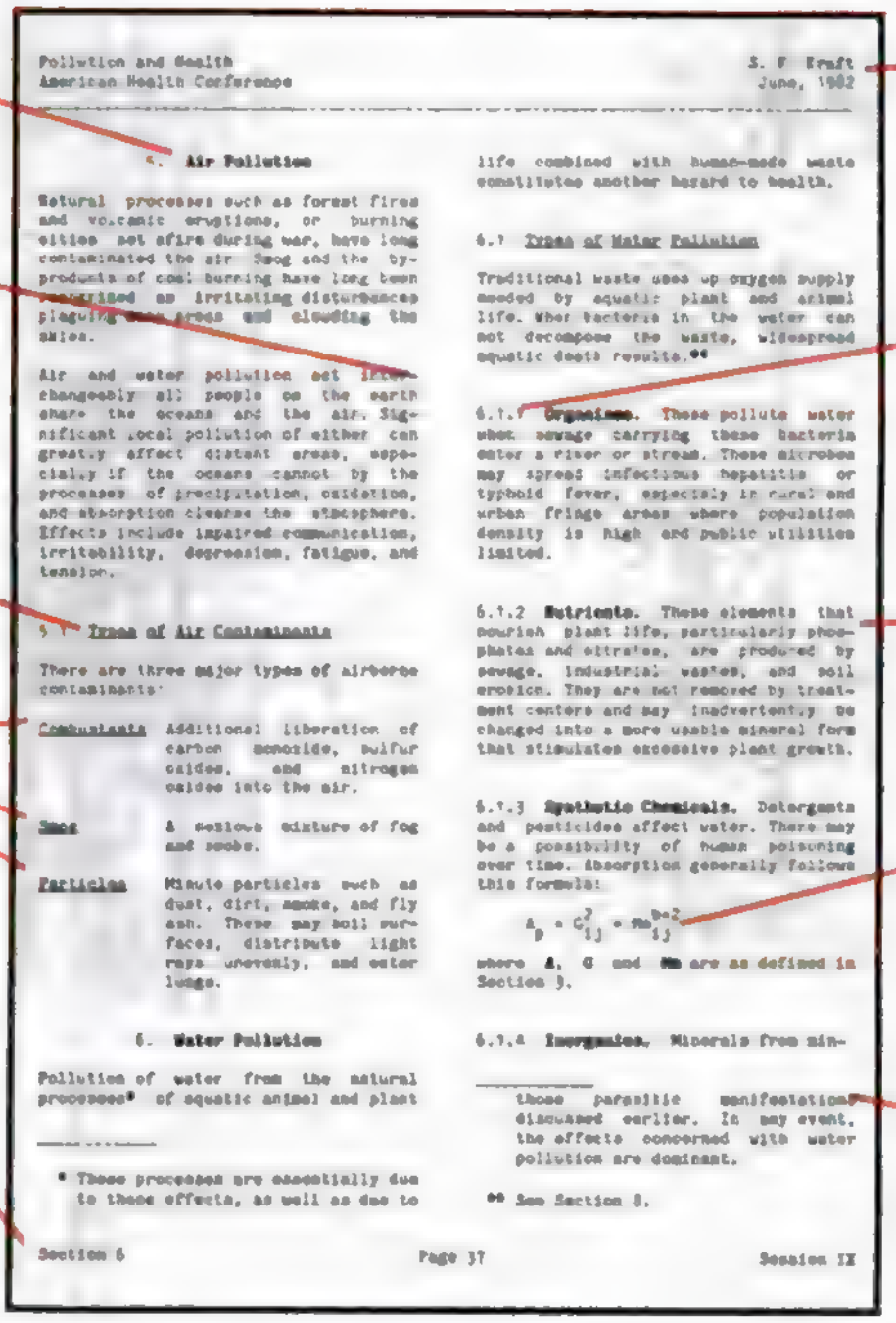
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Pollution and Health
American Health Conference

S. F. Kraft
June, 1982

6. Air Pollution

Natural processes such as forest fires and volcanic eruptions, or burning cities set afire during war, have long contaminated the air. Smog and the by-products of coal burning have long been recognized as irritating disturbances plaguing many areas and clouding the skies.

Air and water pollution act interchangeably all people on the earth share the oceans and the air. Significant local pollution of either can greatly affect distant areas, especially if the oceans cannot by the processes of precipitation, oxidation, and absorption cleanse the atmosphere. Effects include impaired communication, irritability, depression, fatigue, and tension.

6.1 Types of Air Contaminants

There are three major types of airborne contaminants:

Contaminants — Additional liberation of carbon monoxide, sulfur oxides, and nitrogen oxides into the air.

Smog — A swallow mixture of fog and smoke.

Particles — Minute particles such as dust, dirt, smoke, and fly ash. These may soil surfaces, distribute light rays unevenly, and enter lungs.

life combined with human-made waste constitutes another hazard to health.

6.2 Types of Water Pollution

Traditional waste uses up oxygen supply needed by aquatic plant and animal life. When bacteria in the water can not decompose the waste, widespread aquatic death results.**

6.2.1 **Organisms.** These pollute water when sewage carrying these bacteria enter a river or stream. These microbes may spread infectious hepatitis or typhoid fever, especially in rural and urban fringe areas where population density is high and public utilities limited.

6.2.2 **Nutrients.** These elements that nourish plant life, particularly phosphates and nitrates, are produced by sewage, industrial wastes, and soil erosion. They are not removed by treatment centers and may inadvertently be changed into a more usable mineral form that stimulates excessive plant growth.

6.2.3 **Synthetic Chemicals.** Detergents and pesticides affect water. There may be a possibility of human poisoning over time. Absorption generally follows this formula:

$$A_p = C_{ij}^{2} \cdot Mb_{ij}^{b-2}$$

where A, C and Mb are as defined in Section 3.

6.2.4 **Inorganics.** Minerals from min-

6. **Water Pollution**

Pollution of water from the natural processes* of aquatic animal and plant

* These processes are essentially due to these effects, as well as due to those parasitic manifestations discussed earlier. In any event, the effects concerned with water pollution are dominant.

** See Section 8.

Section 6 — Page 37 — Session IX

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CIRCLE 237 ON READER SERVICE CARD

ing relevant results quickly and easily. But if you search further you can see what coverage the NCC received from general interest magazines, rather than just the microcomputer magazines. To do this, you have to leave the Microcomputer Index and look at the Magazine Index (Dialog file number 47). To do this, you simply say:

```
Begin 47
```

Dialog obliges by telling you that your conversation with the Microcomputer Index lasted .194 hours (about 12 minutes) and cost ¢10.28. It then says:

```
File 47:Magazine Index
```

Searching for NCC was such a success in the Microcomputer Index, why not try again? So you enter:

```
Select NCC
```

and Dialog responds with:

```
1 74 NCC
```

This indicates it has found 74 magazine references to the NCC. (Note that you're back to set 1 again, which happens every time you change files.) You ask Dialog to "display" again, and what do you get?

```
1573825 DATABASE: MI File 47
  NCC controversy 'deja vu': current gay right debate recalls civil rights conflict.
  Jones, Arthur
  National Catholic Reporter v19 p6(1) Feb 4 1983
  CODEN: NLCRB
```

IF YOU search further you can see what coverage the NCC received from general interest magazines, rather than just the microcomputer magazines.

```
  DESCRIPTORS: National Council of Churches-social policy; Metropolitan Community Churches-social policy; homosexuality and Christianity-political aspects; ecumenical movement-political aspects
```

"Gay rights"? What does that have to do with the National Computer Conference? A quick check of the title and the descriptors shows us the problem: this NCC is the National Council of Churches. Considering it's a national magazine index, odds are that most of those 74 NCC references are church- rather than computer-related.

So now try a more general approach. Start first by seeing how many computer references there are in the Magazine Index. Say:

```
Select computer or computers
```

where "or" means that you want all references to either "computer" or "computers" or both. Dialog's response (maybe five seconds later) is:

```
8710 COMPUTER
5071 COMPUTERS
2 11220 COMPUTER OR COMPUTERS
```

telling you that it has found 8,710 records containing the word "computer," 5,071 containing "computers," and 11,220 containing one or the other. These records have been assigned to set 2. (You can calculate that about 2,500 records contained both "computer" and "computers"; each of these records is referenced only once in set 2.)

Clearly, to find the National Computer Conference records, you'll have to cut down that set 2 somewhat. How can you eliminate the extraneous records? Well, you know that these are magazine articles, and that magazine articles tend to say

Figure 1-Records found in a search through Select's Magazine Index.

```
1561709 DATABASE: MI File 47
  Shuttle software 'flies' in Houston.
  Lineback, J. Robert
  Electronics v56 p101(2) Jan 13 1983
  CODEN: ELECA
  illustration; photograph
  SIC CODE: 3662; 9661
  DESCRIPTORS: United States. Shuttle Avionics Integration Laboratory-research; space shuttles-simulation methods; flight simulators-computer programs

1507121 DATABASE: MI File 47
  IBM images. (column)
  Fastie, Will
  Creative Computing v8 p270(7) Oct 1982
  illustration; photograph; photograph
  ARTICLE TYPE: COLUMN
  GEOGRAPHIC LOCATION: Houston
  GEOGRAPHIC CODE: NNUSTTXH SIC CODE: 3573
  DESCRIPTORS: National Computer Conference-1982; computer industry-exhibitions; Houston-exhibitions; Compass (computer)-analysis; Digital Equipment Corp.-exhibitions; Wang Laboratories Inc.-exhibitions; computer programs-usage; microcomputers-market share

  1982 National Computer Conference.
  Ahl, David
  Creative Computing v8 p155(12) Oct 1982
  Texas-sized crowd of 70,000 expected for Houston stand. (National Computer Conference)
  Wolff, Howard
  Electronics v55 p146(2) June 2 1982

  Houston gets interface-standard flight. (dispute expected at National Computer Conference)
  Sideris, George
  Electronics v55 p89(2) May 5 1982

  Computers and videotapes help teach physics at Houston. (at University of Houston)
  American School and University v53 p50(1) March 1981
```

where things are happening. The 1982 NCC was in Houston. So try that approach by using an "s" instruction (S is short for select).

```
S s2 and Houston
```

This entry instructs Dialog to identify the records in set 2 (s2) that also contain the word "Houston." Dialog responds:

```
1682 HOUSTON
3 9 S2 AND HOUSTON
```

telling you that it has found 1,682 "Houston" references, and that it has created set 3, consisting of the 9 records with references to both set 2 ("computer or computers") and "Houston." When they're displayed, the records appear as in Figure 1. The first one isn't what you want, but the second reference is on the mark. The following records are in shortened form.

By the sixth record, the references go back to 1981 and are less relevant to you. So this hunt retrieved four relevant articles, none of which you'd seen in the Microcomputer Index. It's possible they were actually there, but you didn't search for anything there but the abbreviated version "NCC," so they didn't turn up.

Looks fairly easy, right? Then why does Dialog strongly suggest that you take its $135, day-and-a-half-long course before you start using the service? (The other services propose similar training.) It's because it takes real skill to be effective at on-line searching; the full power and subtlety of the system is only realized when you know exactly what you're doing.

It's difficult to describe the difference, but an example might help. A colleague of mine wanted to study the newspaper coverage of a particular political issue that was raised last year. Using InfoGlobe, he spent an hour (and over $150) trying to find the information he wanted. He couldn't find it and came away from the experience very critical of on-line searching in general and of InfoGlobe in particular. A few weeks later, I presented the same problem to an experienced, professional searcher with InfoGlobe. In less than a minute she found exactly the information my colleague had been seeking.

Most of the time, you can get useful results from an on-line service right from the start. But to be efficient and cost-effective requires some training and practice. That's why using an on-line service requires a commitment; it's not likely to

A Guide To Search Services

The following are some of the database search services that can be reached through your PC.

Word-Oriented Search Services

Word-oriented search services consist of textual information, organized and indexed to make it easy to locate text on your subject. Typically the services allow little computation, and they charge for their services on the basis of the length of time you are connected to their computers. Some of the largest word-oriented search services are listed below:

Dialog Information Retrieval Service
3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-1927
(415) 858-3785
Number of Databases: 170
The "supermarket" of databases, covering all fields. Largely bibliographic, but also includes databases such as the Electronic Yellow Pages.
Cost and Fee Structure: Per-hour fee varies with database, average $60/hour, maximum $300/hour. Communication extra $8/hour in U.S. No initiation fee, $100 free connect time with subscription.

Knowledge Index
Dialog Information Services
3460 Hillview Ave.
Palo Alto, CA 94304
(800) 528-6050
Number of Databases: 12
Dialog's cheaper, after-hours service aimed at the microcomputer market. Includes some of the most popular Dialog databases. Software is easier to use, but slightly less powerful.
Cost And Fee Structure: $24/hour flat, including communications. $35 initiation fee, includes self-instruction manual and two hours free search time.

SDC Search Service
2500 Colorado Ave.
Santa Monica, CA 90406
(800) 421-7229
(213) 453-6194
Number of Databases: 70
Largely bibliographic, with heavy coverage of science and technology. Also a number of exclusive databases such as World Patents Index, and the index to the *Christian Science Monitor*.
Cost And Fee Structure: Per-hour fee varies with database, $70/hour average, plus $8/hour communications. Initiation $125, includes self-instruction manual and $300 on-line time.

BRS
1200 Route 7
Latham, NY 12110
(800) 833-4707
(518) 783-1161
Number of Databases: 75
Broad range of subjects, mostly bibliographic, but including a number of unique full-text databases such as the Academic American Encyclopedia.
Cost And Fee Structure: Per-hour fee varies with database, $60–$70 average, plus $6–$11 for communications. $50 initiation fee applicable to on-line time.

BRS After Dark
1200 Route 7
Latham, NY 12110
(800) 833-4707
(518) 783-1161
Number of Databases: 25
BRS's cheaper after-hours service, including its most popular databases. Easier to use than BRS main service.
Cost and Fee Structure: Per-hour fee varies with database, from $6 including communications. $50 initiation fee includes manual. $12/month minimum billing.

WORD-oriented search services charge for their services on the basis of the length of time you are connected to their computers.

VU/TEXT Information Services
P.O. Box 8558
Philadelphia, PA 19101
(215) 854-8297
Number of Databases: 6
Full text of *Philadelphia Enquirer and Daily News, Lexington Herald-Leader, Wall Street Transcript, Pennsylvania Legislative Database, Academic American Encyclopedia*. To be expanded to cover all Knight-Ridder newspapers.

Info Globe
444 Front Street West
Toronto, Ontario, Canada M5V 2S9
(416) 585-5481
Number of Databases: 1
Full text of *Toronto Globe and Mail*, available at same time as printed version.
Cost and Fee Structure: Approx. $127/hour (in Canada $159). No initiation fee, no minimum.

NewsNet
945 Haverford Rd.
Bryn Mawr, PA 19010
(215) 527-8030
Number of Databases: 112 newsletters
Electronic editions of private newsletters in over 30 subject areas. Heavy concentration in computers and electronics, but includes also *Latin American Energy Report* and *Ecology USA*.
Cost and Fee Structure: $24/hour to search newsletters, $24 to $120/hour to read them (at 300 baud; price is double for 1200 baud). Prices are lower for subscribers to print version of newsletters. No initiation, $15/month minimum.

The missing service: As of July 1983, the *New York Times* on-line service is available exclusively through Mead Data Central, a major database service specializing in full-text magazine and newspaper databases. Mead isn't included here because you can't access it from an IBM PC; you have to use one of Mead's dedicated terminals. If you are interested, the address is Mead Data Central, P.O. Box 933, Dayton, OH 45401, (800) 227-4908.

Number-Oriented Database Services

Number-oriented databases usually consist of sets of numbers that are meant to be manipulated, rather than just retrieved and looked at. Probably the most common type of numeric information is the "time series," which is simply a set of values for some phenomenon at different points in time. For example, the price of gold in London at the close of trading each day in March 1983 is a time series. Because the information is meant to be manipulated, the charges for using numeric data bases depend not only on how long you are connected, but on the amount of computation you ask the host computer to do.

THE CHARGES for using numeric data bases depend on the amount of computation you ask the host computer to do.

I. P. Sharp Associates Ltd.
2 First Canadian Place #1900
Toronto, Ontario, Canada M5X 1E3
(416) 364-5361
Number of Databases: 100
Statistical and economic information, huge collection of aviation information, historical stock and bond prices.
Cost and Fee Structure: $1/hour connect plus $.70 per thousand characters transmitted, plus $.45 per "CPU unit" (the biggest part of the charge).

Chase Econometrics
150 Monument Rd.
Bala Cynwyd, PA 19004
(215) 896-4772
Number of Databases: 100
Economic and financial databases, including historical and projection data, and projection models.
Cost and Fee Structure: Minimum $1,000 per year, plus computer time, per data base. —*J.H.*

be right for you if you want to use it only once a month for a few minutes.

Fees and Charges

The Magazine Index search in our example, which included a fair number of false starts that are typical of an inexperienced searcher, cost $15.60. An experienced searcher probably would have cut that down to about $10.00.

Add $15.60 to the $10.28 expended on the earlier Microcomputer Index searches, and you come up with a figure of about $26 for about 20 abstracts of or references to articles dealing with the National Computer Conference.

These charges are based on a per-hour fee for being connected to the particular database, plus $8 per hour for communications costs. This per-hour charge is typical of the word-oriented services, and varies little from service to service. The services differ, however, in charges for up-front deposits, manuals, and training. The accompanying list of search services gives a rough idea of the breakdown.

So comes the big question: Is it worth the money? And comes the answer: It depends.

Who Needs to Search?

In the example, your initial reason for searching for NCC references was that you needed evidence to convince a newspaper editor to send you to attend the NCC so that you could write some articles for him. Is this information worth $26? Depends on whether it convinces the editor! But without an on-line search, it would have taken vastly more time to collect the evidence, and you probably wouldn't have found nearly as many references. On the other hand, if you had found them at the library, while you were there you could have made photocopies of the articles. In this

WITHOUT an on-line search, it would have taken vastly more time to collect the evidence.

particular case, though, the article references are probably all a busy editor will need to look at anyway.

How can you decide whether there's enough information of interest to you to be worth using an on-line service?

Odds are you're going to find more use for a database if you're a scientist, a doctor, an engineer, a lawyer, or a specialist or professional in another clearly-defined discipline. There are two reasons for this. First of all, disciplines beget organizations and university faculties, and these beget journals and indexes of journals. So in these fields lots of information is being generated especially for you, in a structure that's amenable to on-line indexing. The second reason, which is the other side of the same coin, is that your information needs are likely to be clearly defined.

So if you're in one of the professions, write to each of the three big on-line services (Dialog, BRS, and SDC), get lists and descriptions of their databases, and see which one is going to be most useful to you. If you're in a medical field, chances are BRS will be your choice. If you're in research and development, SDC has a number of useful databases that no one else has. Dialog's the biggest service, and its databases often overlap with the other two, so with Dialog, you may well find everything you need in one place.

If you're not a professional in a tightly-defined discipline, it will be harder to assess which of the database services can best meet your needs. It's also less likely that any are ready to serve you well, at least until more full-text databases and popular-press databases become available.

General Interest Searches

Right now, several such resources are available. You have a number of newspapers. Knight-Ridder, the big newspaper chain, is gradually bringing its papers on-line in a service called VU/TEXT. At the moment it has four papers available, the *Philadelphia Enquirer* being the best known. Surprisingly, the best newspaper service currently available is a Canadian service called Info Globe, the electronic edition of the *Toronto Globe and Mail*. Its coverage of United States news at the national level is fairly complete, and its international coverage is better than most United States papers'. It is available on-line the same day it is published (next day service is provided by VU/TEXT) and it maintains 6 years' worth of text in a single database (only 3 years' worth of the *Philadelphia Enquirer* in three separate files are available from VU/TEXT). The *New York Times* also produces an on-line version but, as of this month, sells it exclusively through Mead Data Services, which won't let you connect to its service with your PC—you need a special terminal.

Besides newspaper databases, there's NewsNet. NewsNet makes over 100 of those specialized, hundred-dollar-a-year-and-up newsletters available on-line—things like *Agri-Markets Data Service*, *Entrepreneurial Manager's Newsletter*, *Legislative Intelligence Week*, and an assortment in the computer and communications fields. You can search them for any combination of words for a flat $24 per hour. If you want to read them and you're already a subscriber to the print edition, the price is still $24 per hour. However, if you don't subscribe to the print edition, the price jumps to as high as $120 per hour.

BRS AND Dialog offer easier to use and cheaper, but less powerful and less extensive, after-hours services.

Although Dialog began as a bibliographic database, as did SDC and BRS, it has since adopted a "supermarket" philosophy and has included a number of databases of considerable interest to the nonspecialist user.

For example, its Electronic Yellow Pages allow you to search the yellow-page listings of the entire United States by business categories, city or state, zip code, telephone number, or city population. A search that cost about $20, for example, revealed that there were 11,543 establishments classified as "Nightclubs and Discotheques" in the United States, of which 116 were in Massachusetts. If you had those entries listed on your PC, and if your terminal software allowed you to store what's listed, then for a few minutes time and a few dollars you'd have a perfect contact list. This could mean money in your pocket if you are a liquor salesman, a manager of a rock band, or an exotic dancer (in the last case you could have excluded Boston from your search).

Social climbers and corporate executives looking for prospective board members will find the on-line edition of *Who's Who* useful. Journalists, lobbyists, lawmakers, and lawyers might take advantage of the "Congressional Record Abstracts" or "Federal Index" databases. The U.S. Department of Commerce maintains a "Trade Opportunities" database on Dialog, with such listings as Pakistan government tenders for railway ties. The Department of Commerce considers this database useful enough that Dialog users outside the United States cannot access it.

And if you're not sure how interesting or useful all this is, or if you want to learn how to do searches for a lot less money than the standard on-line services charge, both BRS and Dialog offer easier to use and cheaper, but less powerful and less extensive, after-hours services. BRS calls its service "After Dark," and it gives you about half of the full BRS service, with a simple, menu-driven command structure. Dialog's "Knowledge Index" offers a dozen or so of its 170 databases, including the National Newspaper and Magazine Indexes mentioned above. The "Knowledge Index" doesn't offer access to the Microcomputer Index, or the Electronic Yellow Pages, or many of the powerful trade and industry databases available on the full service, but it's a great way to get started.

Data by the Numbers

Number-oriented databases store strings of numbers rather than text. If these numbers represent measures of the same thing at different points in time, the string of numbers is called a "time series." For example, Malaysia's imports in U.S. dollars, each year from 1970 to 1982, are shown as a time series with 13 values in it.

I.P. Sharp maintains what is probably the largest collection of public numeric databases; it claims it can give you 40 million different time series from 100 different databases. To see clearly the difference between a numeric- and a word-oriented





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service, consider one database that's maintained by both Dialog (as a word-oriented database) and I.P. Sharp (with a numeric orientation).

This database is produced by Business International Corporation, and is called BI/DATA. The data consists of 21,000 time series for 131 different countries. Say that you're interested in exports from Malaysia. With Dialog, you could search for "Malaysia and exports," and find that there were six records with captions such as "Total exports," "Exports to U.S.," "Exports to Japan," and so on. If you displayed one of the records, you would see a table of numbers: "In millions of Malaysian dollars. 1970 $375,000 1971 $412,000 . . ." and so on. That's it. Each of the six records contains the appropriate table, but on a word-oriented service, you can do nothing but retrieve the table and print it or store it on your computer.

Compare this with how exactly the same data can be stored and manipulated using I.P Sharp's numeric orientation. You can retrieve total Malaysian exports. You can convert it to U.S. dollars. You can retrieve the U.S., Japanese, and other subsets, and convert them to the same currency. You can print out the whole set as a single table, and you can choose the format of the table. You can go to an entirely different database, say for currency exchange rates, and discount each figure according to currency exchange rates in each year. And you can even have the data printed as a graph, or have it graphed on one of I.P. Sharp's plotters. These are all functions in which a numeric database and the accompanying software excel—they are beyond the capacity of typical word-oriented software.

MAKING effective use of this powerful software requires practice and commitment.

But making effective use of this powerful software requires even more practice and commitment than with a service like Dialog. If you wrote an I.P. Sharp command to build a table of Malaysian export data, in U.S. dollars, on a per-capita basis, it would look something like this:

```
PUT 'USA/PC' BIHIST 'IMPT, IMUS,
IMEEC, IMJAP/MLY'
```

This is considerably more cryptic than anything you'll see in Dialog. By the way, the cost of producing a graph of the export data described above would be in the $30 to $40 range; retrieving and printing the simple tables with Dialog would cost about $20.

The bottom line? On-Line services are an unbeatable tool in terms of speed and power of information retrieval. The real question is: does the service have information you can use? If so, it's right for you. */PC*

How Databases Are Organized

The secret behind swift and successful searches is the inverted file method used by major databases.

The ERIC database of educational references contains 480,000 records, the Electronic Yellow Pages has over 2,500,000 in its retailers subsection alone, and the Chemical Abstracts Service search database has an unbelievable 5,720,000 records. Yet within a few seconds, Dialog or SDC or BRS can tell you how many records contain a particular word in any one of these databases, and the speed doesn't seem to be related to the size of the database. How does this work?

The answer is indexing and inversion. You can think of each bibliographic reference as being like a single index card found in a library catalog. In computer terms, each card is a "record"; each record, therefore, represents one bibliographic reference. Each month, database producers send the search services computer tapes carrying the records for that month's additions to the database.

The first thing the search service does is assign an internal reference number to each record. The second thing it does is create an inverted equivalent of the database or the updates.

Inverting a database means creating a new version of the database, which consists of a list with each word in the data followed by a set of pointers to the records in which the word occurs.

For example, here's what a part of the inverted version of the first four paragraphs of this article would look like, using paragraph numbers as record numbers:

```
card        2
chemical    1
computer    2
consists    4
create      3
creating    4
data        4
database    1  2  3  4
databases   1
does        1  3
doesn't     1
each        2  3  4
```

For example, the word "card" appears in paragraph 2, and "database" appears in paragraphs 1, 2, 3, and 4. If the inverted file is itself indexed, the computer will know that the "d"s start with the 6,512th position in the inverted file. It then becomes quite simple for the computer to head directly for that alphabetical section and respond in a few seconds that the word "database" occurs in all four paragraphs, and that "database" and "does" occur in the same paragraph only once (in paragraph 3). Of course, searching for "does" and "each" isn't likely to be very useful, but exactly the same approach is used to search for "gifted" and "child" in the ERIC educational-research database, or "stationers" and "Missouri" in the Electronic Yellow Pages, or "toxic" and "dump" and "water table" in the Chemical Abstracts database.

Once the software, working through the inverted file, has determined that a particular set of records contains the combination of terms specified in the search, it uses the record numbers (like the paragraph numbers given above) to go and fetch the actual bibliographic references in their uninverted form. *—J.H.*

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PIE:Writer:	**Apple II, IBM PC**	**$149.95 $199.95**	**84¼**
A.B. Dick Magna SL	dedicated word processor*	$14,500	83
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". . . a formidable contender in performance to price ratio . . . PIE:Writer is hard to beat."

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". . . much has been gained in this update to a time-tested classic."

Why the experts love PIE:Writer.

Why all the fuss?

Here are some of the features reviewers chose as the basis for PIE:Writer's excellent performance, and the reasons why you should choose PIE:Writer:

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PIE:Writer is easy to learn, with an excellent new set of user documentation.

PIE:Writer is copyable to back-up disks.

PIE:Writer can edit either text or programming code.

PIE:Writer is compatible with a wide range of hardware.

And reviewers note that PIE:Writer has refined the most sought-after editing features:

- ✔ wrap/columnar option
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- ✔ justify right and left
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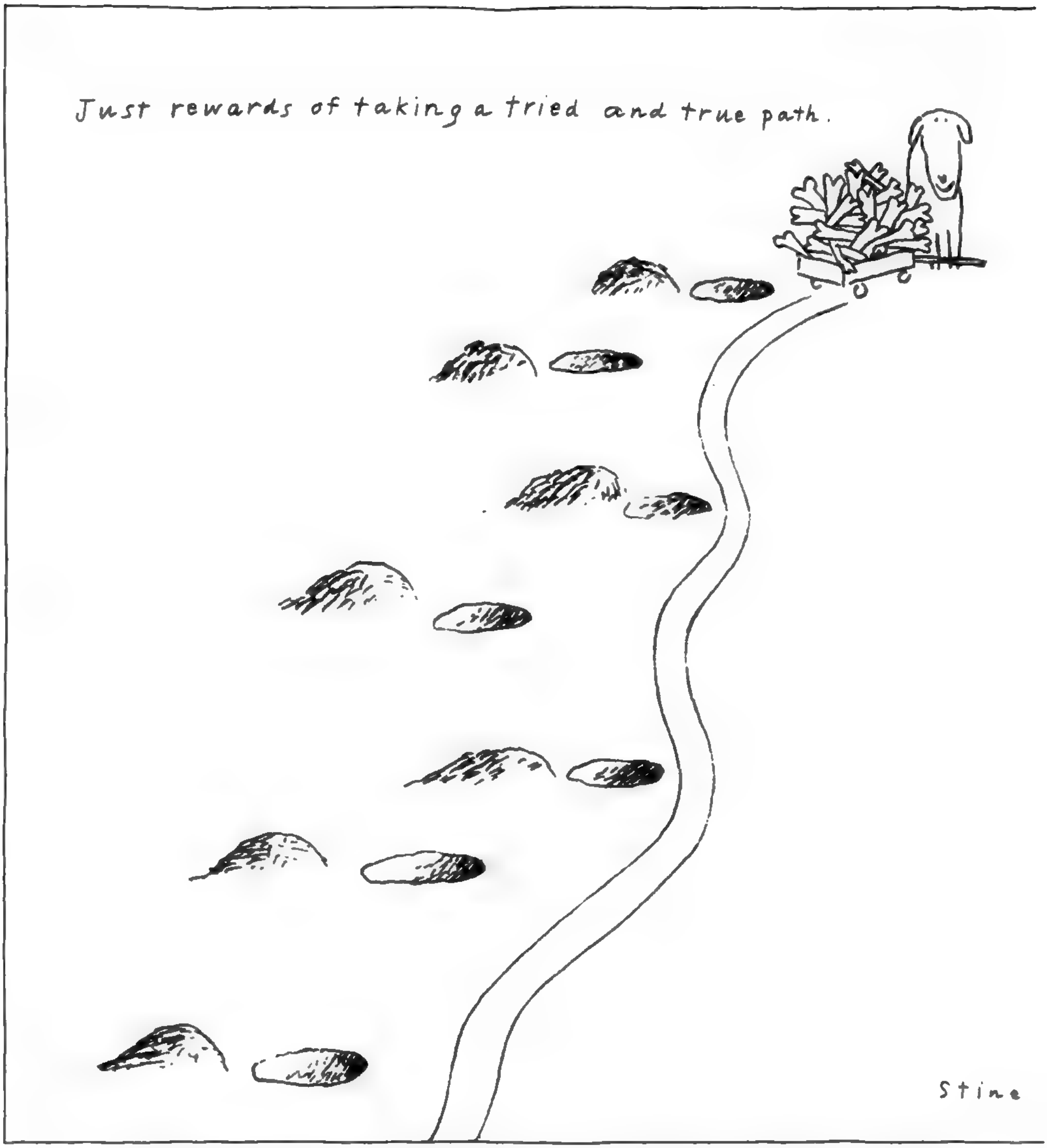
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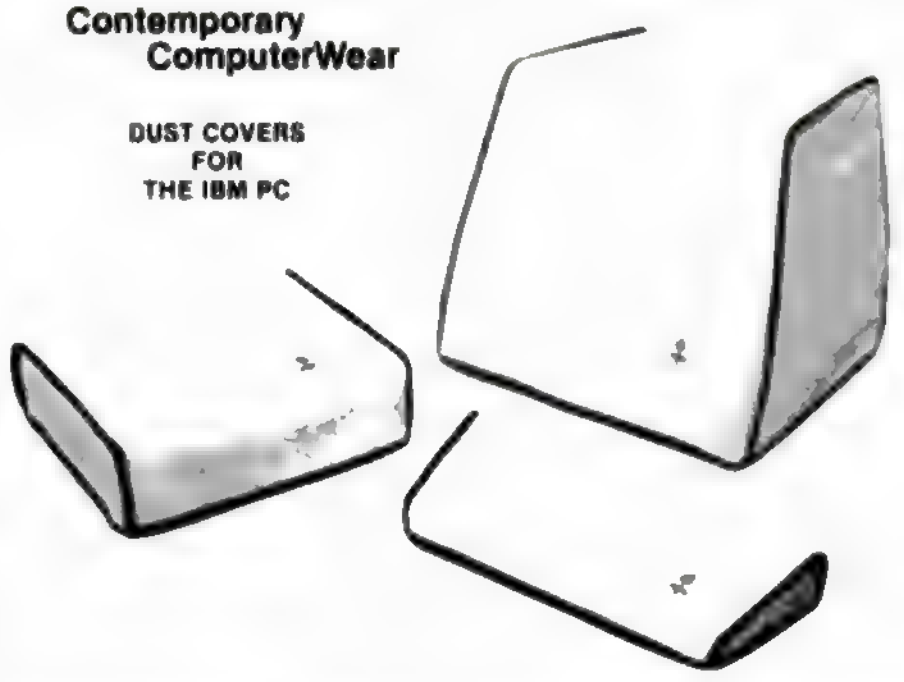
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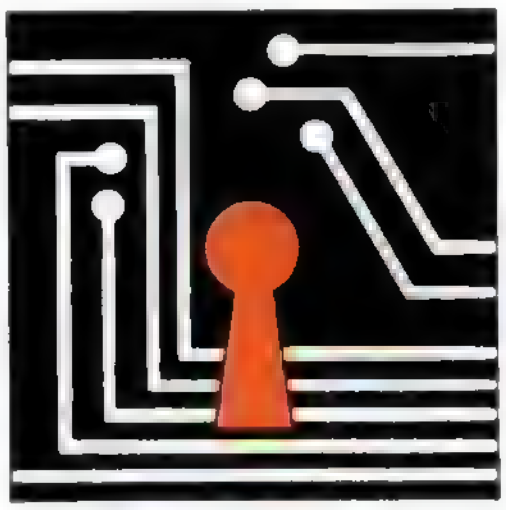
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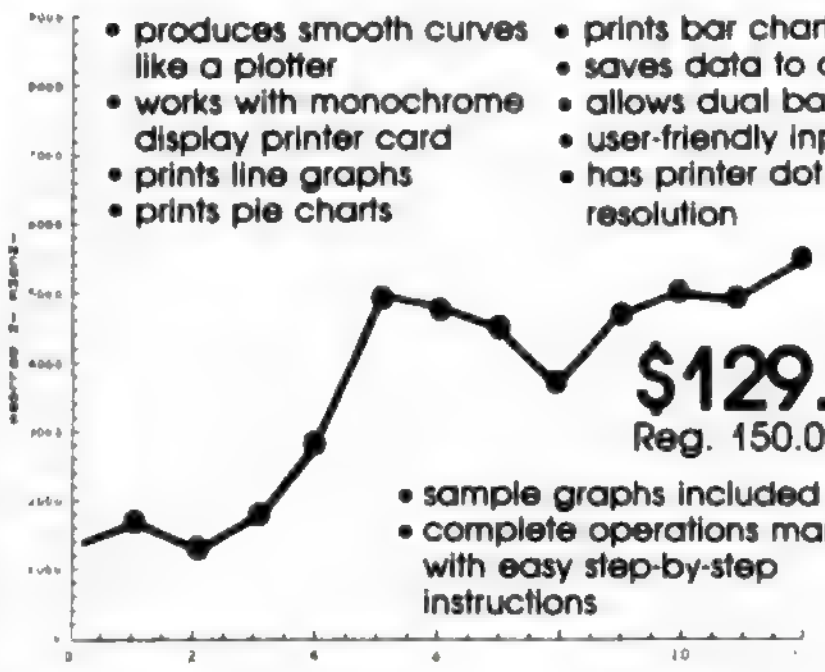
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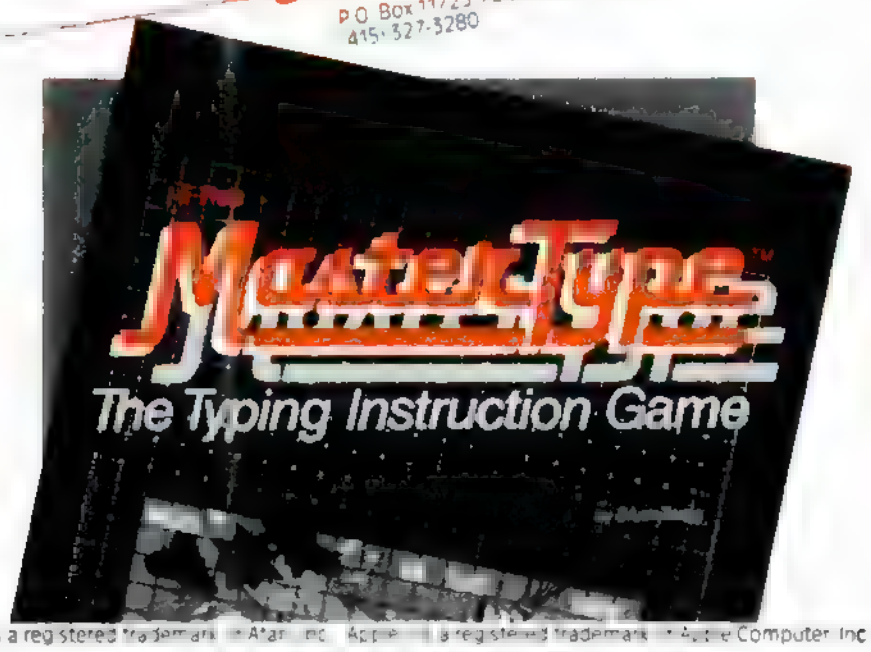
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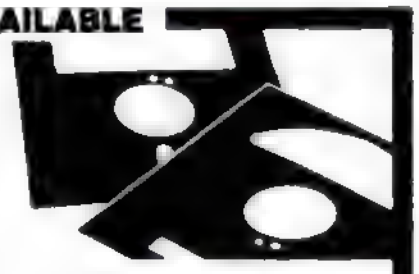
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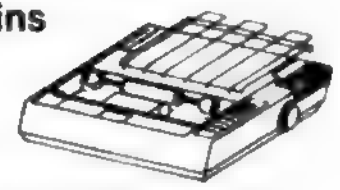
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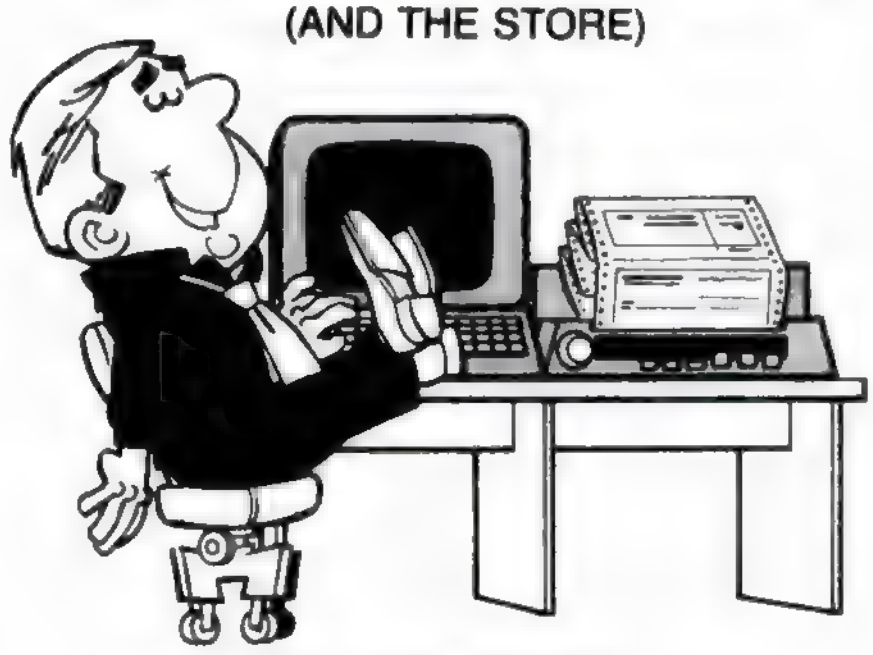
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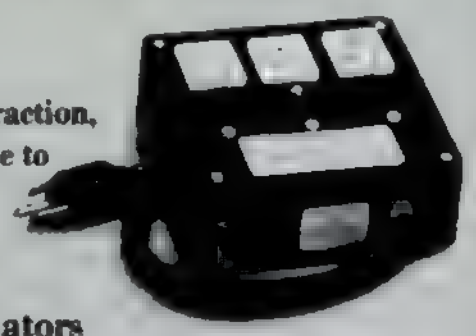
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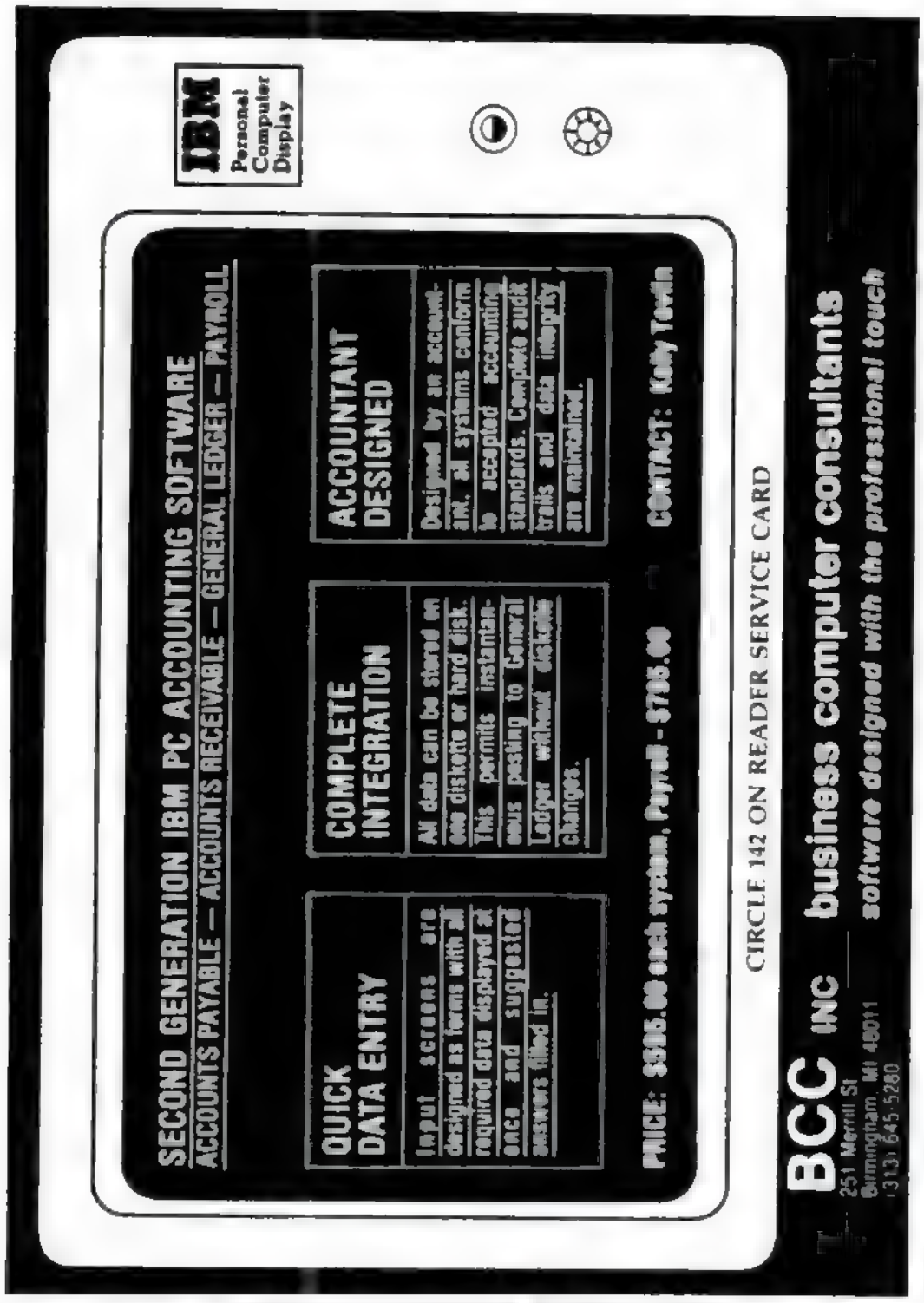
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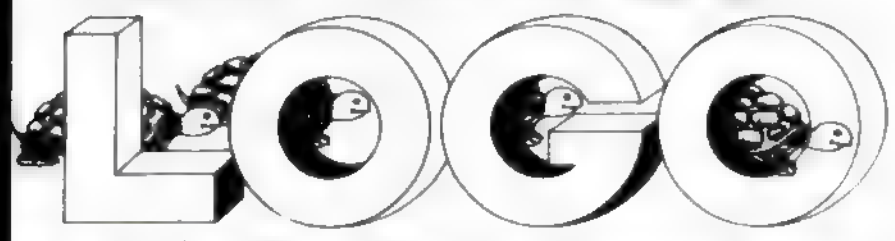
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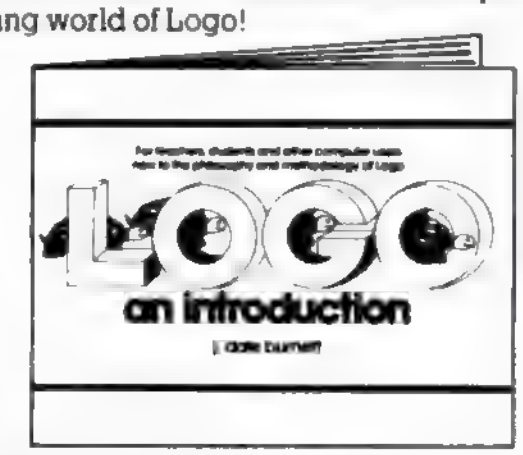
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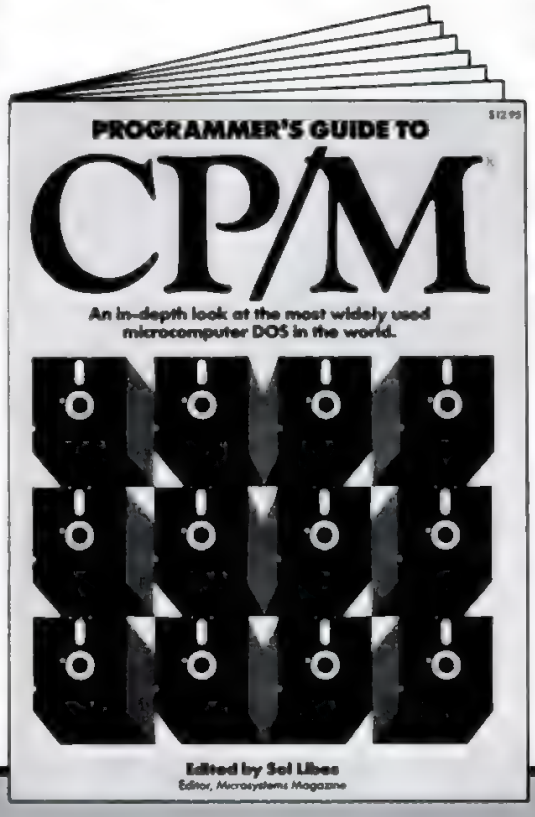
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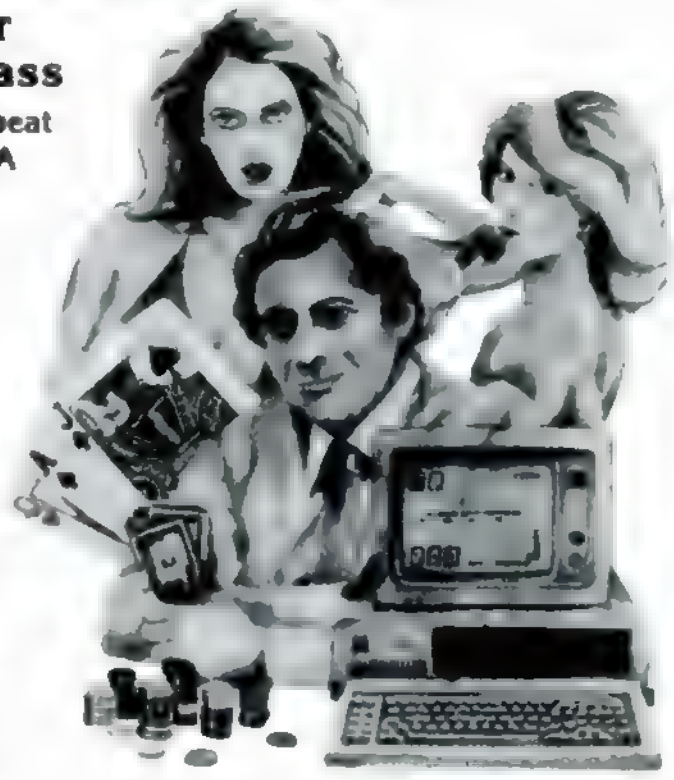
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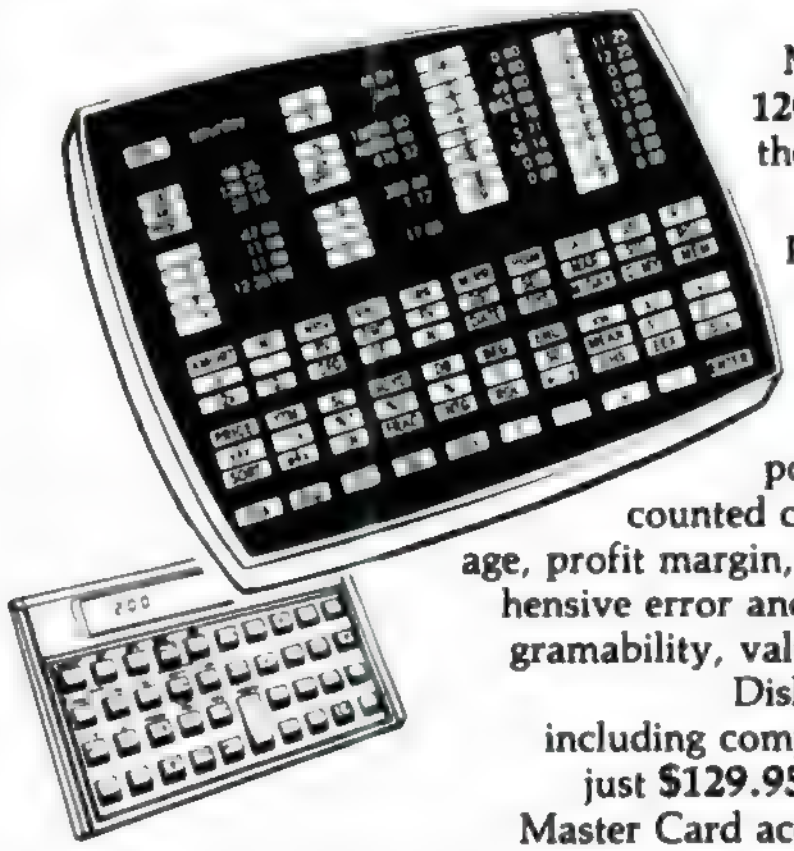
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well to change. It can't be modified easily to pick up nuances," Lynch said.

The large-scale operations of the mainframe require what Lynch described as "rigid and standardized" programming in order for various agencies to share the big computer. The problem is that a mega-enterprise like New York state government isn't uniform and it isn't rigidly stan-

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dardized. Budget evaluation and implementation differ dramatically, depending on the agencies' operational needs. For example, institutional agencies such as psychiatric hospitals and developmental centers for the retarded are heavily population-oriented and labor-intensive. In contrast, state-run health programs have heavy nonpersonnel expenses. Within New York's giant State University system, spending needs vary depending on such variables as faculty-student ratios, academic disciplines, and the relationship between graduate and undergraduate programs, Lynch explained.

There are other variables that must be factored in but that may change drastically from year to year. When the state began computerized budgeting in 1972, controlling energy costs was not a major concern; today it is. Another critical variable comes from the Governor's office where policy priorities may change significantly from year to year.

Just as the needs of government programs and agencies vary, so do the techniques of the approximately 230 professionals who evaluate budget requests. "Virtually every examiner's method of arriving at budget recommendations is different," Lynch said. The mainframe is "very good at number-crunching at the top but doesn't serve the individual examiners well," he explained.

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Budget Division into the world of microcomputers and, specifically, into the world of the IBM PC.

Opting for the PC

The Budget Division studied the possibility of using microcomputers for about a year and a half. The decision to acquire PCs was based on several criteria, according to Lynch, who said the capabilities and "ease of use" of the PC offer "probably the ideal flexibility for our examiners."

The Budget Division experimented first with two Apple II Pluses, but with the arrival of IBM PCs, the Apples are now being used only for special applications, Lynch said.

The Budget Division now has approximately 25 PCs, one of which sits on Lynch's desk. About one-third of them are equipped with Amdek Color II monitors, including Lynch's. The rest, which aren't needed for graphics, use less expensive Zenith monochrome monitors. There are about 16 Anadex Silent Scribe printers scattered throughout the Budget Division, Lynch said. In addition, the Budget Division has 17 Displaywriters, which are used for writing reports, correspondence, and budget narratives.

Although the PCs are a relatively new addition to the Budget Division, they've already been used in various applications. For example, the division uses the micros to keep track of how well agencies are meeting personnel reduction targets, particularly in light of the Governor's directive to trim the size of the state work force by 14,100 positions. All the summary level information for layoffs was done on the PCs, Lynch said.

In an effort to reduce transportation expenses, the state has tightened controls on the use of its cars. The PCs are being used to track the assignment of state vehicles and their mileage so that replacement costs and scheduling can be projected. In the pre-PC era, that task was done manually, and accurate replacement estimates could not be made for individual vehicles. "Now we can do it by vehicle. We can track the individual mileage," Lynch said.

THE ISSUE facing us now is the next generation of spreadsheets.

The PCs offer a special advantage for the Budget Division: work can be brought to a uniform level and data can be automatically transferred between the PCs and the IBM mainframe, according to Lynch. "We need to communicate up and down with the mainframe and across to our word processing equipment. We need a fully integrated system. Although IBM didn't have all the software to make the connections, then or now, I expect they'll find the standard. The technology is there today," Lynch said.

To help integrate its system of PCs, Displaywriters, and mainframe, the Budget Division has retained an IBM Application Transfer Team to study "how best to link all this equipment," Lynch said. Based on its recommendations, a final choice is expected to be implemented by the fall, when the agency begins the annual round of "budget-making" for the upcoming fiscal year, which starts April 1, 1984.

Self-Supporting Staffer

Aside from the added efficiency and practicality it lends to government operations, the new system is expected to more than pay for itself in savings, according to Lynch. Each year, it costs about $300 thousand to compile and print the Governor's voluminous budget message to the Legislature. The document—which ran 686 pages for fiscal 1983-1984—details the Governor's budget requests, including how he wants to spend state money and where he expects to find the money to spend. Currently, the mainframe produces the statistical tables but the narrative must be typeset and proofread. "It takes an enormous amount of time to proofread," said Lynch, who estimated that the costs of typesetting and making corrections now account for 75 percent of the project's annual expense.

When the hardware is fully integrated, the mainframe will receive all its data through the PCs. The Displaywriters also will dump text into the mainframe which

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then will merge the data and text, eliminating the need for typesetting. Using the Budget Division's existing staff, Lynch said his agency will be able to do all the editing and proofing itself, thanks to the integrated system.

The switch to PCs and integration of the microcomputers, Displaywriters, and mainframe cost about $200 thousand, Lynch said. This investment will quickly pay for itself, he predicted. "I expect to recoup it within 2 years just in savings in printing costs alone."

Software Choices

Second to electronic data management, a spreadsheet is the next most important thing, Lynch added. The spreadsheet is a budget examiner's central fiscal planning tool, and an electronic spreadsheet makes it easy to manipulate data.

For its spreadsheet needs, the Budget Division decided on *VisiCalc*. According to Lynch, *VisiCalc* provides ease of use at the individual level while allowing the agency to conform examiners' data to a single large database. "It will go a very long way in solving most of our applications problems, but we don't want to stand still," he commented.

Although no changes in the use of *VisiCalc* are planned, at least through completion of the fiscal 1984-1985 budget, the Budget Division isn't shutting its eyes to new developments in the quickly evolving field of spreadsheet programs. "The issue facing us now is the next generation of spreadsheets," Lynch explained. Right now, the agency is experimenting with *Lotus 1-2-3* and intends to test other spreadsheet software as well. "We plan to put a team of users on it to advise us," he said.

Special Capabilities

Looking ahead, the Budget Division will need software that can "immediately" translate spreadsheet entries into graphic form. With that capability, "what-if" scenarios can be more easily compared and evaluated, Lynch said.

A LARGE staff can't be expected to adapt overnight to a shift to microcomputers.

As an example of how that capability would be useful, Lynch described a hypothetical state Taxation and Finance Department problem in deciding how to deploy 100 extra tax auditors. The bottom line is to find what mix of auditors would deliver the best return on the state's investment, what assignments would bring in the most money in relation to the salaries and expenses incurred by the auditors. In the analysis, variables would include past returns on investment by type of tax—sales, corporate, personal income, or estate—size of business to be audited, and the number of auditors presently assigned to that tax. Also factored in would be the projected saturation points at which added staff would produce only marginal increases in revenue. With a graphics display, "we can experiment with different mixes and see the results on a line or a bar chart."

Although such graphic displays will be helpful to the budget examiners who must wrestle with a particular problem and suggest solutions, the importance of instant graphics goes beyond the Budget Division's own professional staff. Graphics are "even more useful for the policy people who have to make the decisions," Lynch explained. Often they are political people who may not understand how to read a spreadsheet, but who can compare charts and understand how variables account for the differences. "When we do 'what-ifs,' they can look at graphics rather than numbers," he continued.

The Budget Division is also using *VisiCalc*'s companion software, *VisiFile*. With *VisiFile*, examiners can monitor budget "add-ons," pet projects added by the Legislature to the budget. "We get a lot of calls on these from constituent groups and legislators wanting status reports on whether the money is being spent and how," Lynch explained. With *VisiFile*, the Budget Division can answer those questions. He said the data on the add-ons is stored in the microcomputers according to a variety

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of indices. For example, their status can be retrieved based on which legislative house first passed the measure, by title, by the government agency that administers the project, and by the Budget Division unit responsible for overseeing its spending.

Training Personnel

As with any major organizational change, a large staff can't be expected to adapt overnight to a shift to microcomputers, even a shift to user-friendly ones.

Some of the Budget Division staff had previous exposure to computers, especially examiners who were in college or graduate school recently. Others were familiar with the mainframe terminals in the Budget Division offices. However, even these groups generally were unfamiliar with the use of personal computers. As a result, the Budget Division contracted with Arthur Anderson & Co. to provide 2 days of training on the PCs for about 260 employees, all the professionals, and some of the clerical staff. The training program covers the use of the PCs and *VisiCalc*.

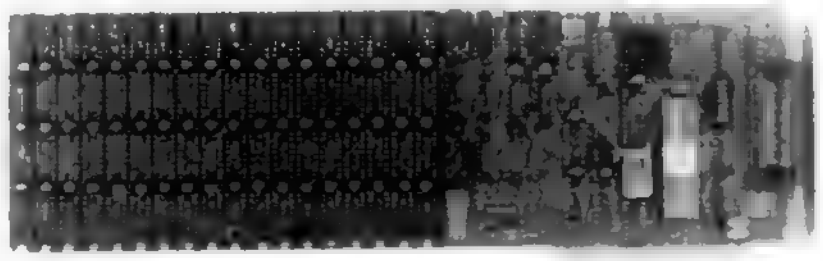
A goal of the training program is to help employees overcome psychological objections to using personal computers. "The biggest problem," Lynch said, "is getting past the mental barrier, which says, 'It's only a little bit of information. I'll put it on paper.' But soon you have seven or eight changes on pieces of paper."

While diversity of style is one reason that the Budget Division decided to acquire PCs in the first place, it does pose some problems in the early stages as employees try to acclimate themselves to personal computers. "Each of our employees does everything a little differently. They're finding it's a challenging course, and some are having trouble taking the information and seeing where it would apply to their individual jobs," Lynch said. "We have to give them the basic tools and understanding of how it works, then let them develop their own applications," he said.

To help resolve troubles, the agency intends to hold information-sharing sessions every 2 weeks where one budget examiner will sit down for 1½ to 2 hours and explain to colleagues what applications he or she is using the PC for. Those discussions will cover how each application was put up and what problems had to be overcome for each application. */PC*

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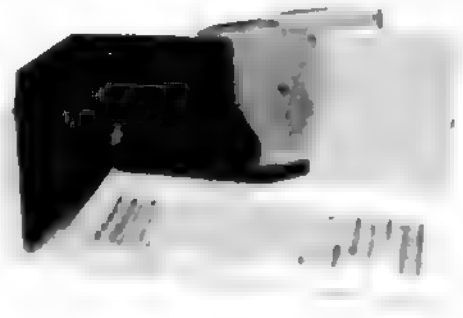
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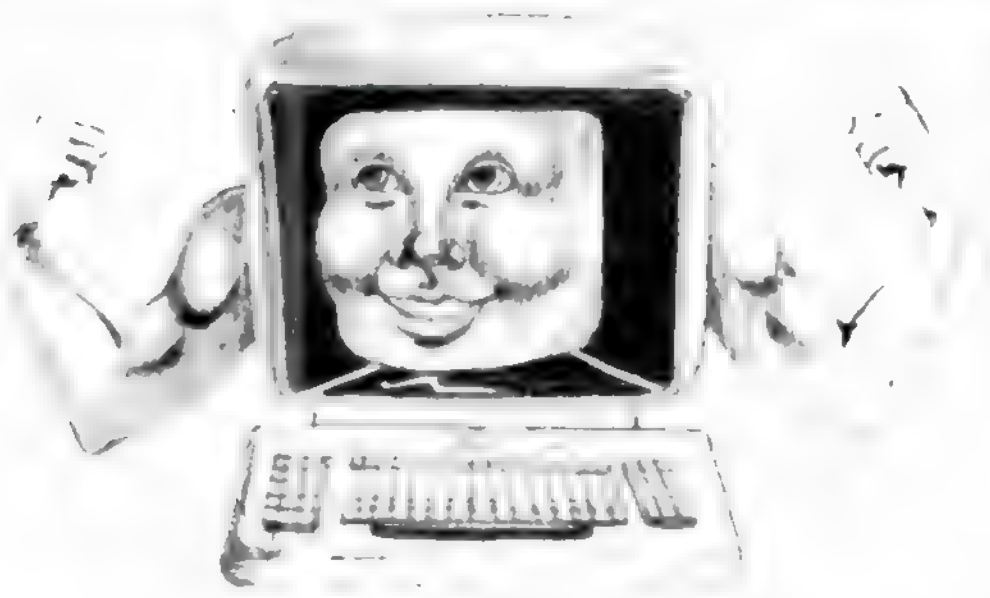
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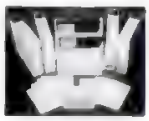
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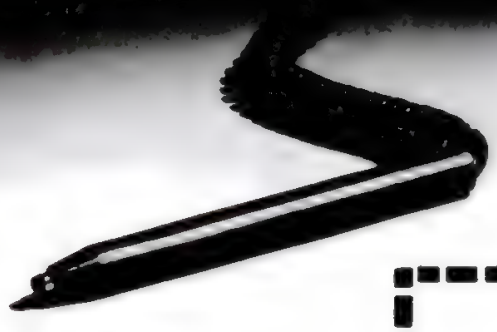
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While the best of the latest applications and games software might be characterized as "exciting and novel," when describing a compiler, "neutral and predictable" are high words of praise. The Lattice C compiler is exactly that: neutral, predictable, and without surprises. It is also perhaps the best C compiler available for PC-DOS.

The C language is favored by many professional software developers because it combines some advantages of a high-level language—portability from one computer to another and ease of structured programming—with many of the advantages of low-level languages, such as speed and easy access to the computer hardware. If you are not familiar with the C language, check the standard reference and tutorial text, Kernighan and Ritchie's *The C Programming Language* (Prentice-Hall, 1978).

Five of the growing number of C compilers available for the PC were reviewed in an earlier issue of PC ("Five C Compilers" Volume 1 Number 10). Point by point, the Lattice compiler compares

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favorably with the best of them.

Since portability is one of the language's strongest attractions, a good C compiler should conform closely to the de facto standard, defined by the Kernighan and Ritchie book. The Lattice C manual details the differences, which are minor, between this version and the standard. One class of changes makes this implementation a bit stricter about pointer manipulation: Lattice C makes a firm distinction between a pointer to an object and a pointer to the first element of the object. Also, pointers are "typed"; that is, if a variable declared as a pointer to one type of object is assigned the address of another type of object, a warning message will be generated.

The other significant change allows members of different structures to have identical names, which implies that references to structure fields must be complete enough for the compiler to determine exactly which structure is being referenced. These changes do not significantly affect portability; they do, however, discourage programmers from using certain unclear programming constructs of dubious desirability.

Error Diagnostics

The usefulness of a compiler is directly proportional to the help it gives in writing good, working programs. Thus, clear error diagnostics, which accurately pinpoint mistakes in a program, are highly desirable. The Lattice compiler gives reasonable, precise diagnostic messages, but it doesn't recover well after finding an error. I usually received several spurious messages for each legitimate error. This slowed down the debugging process, because I could trust only the first message. I found myself compiling a program with five minor syntactical errors six times. Given that Lattice C is an otherwise blemish-free product, this is a major annoyance. On the bright side, the manual lists and explains the diagnostic messages; this was a serious omission in other C compiler manuals. It was reassuring to read that an "object file error" simply meant that my floppy disk was out of space. Other manuals often leave the meaning of diagnostic messages to the programmer's imagination.

The C language, good as it is, is not appropriate for all situations, so the ability to mix routines written in another language into a C program is important. The Lattice compiler makes it easy. Not only is its function-calling sequence straightforward and well documented, but the compiler produces PC-DOS object files and uses the PC-DOS linker, which makes it much easier to use a mix of languages. A sample assembly language program is supplied with the compiler to illustrate this capability.

Floating point numbers are represented in the proposed Institute of Electrical and Electronics Engineers (IEEE) standard format, which is compatible with the Intel 8087 chip, although the compiler does not support use of the 8087 itself. Floating point errors can be detected by the user program; this seemingly minor feature, often forgotten by compiler writers, is of crucial importance in writing robust application programs.

Lattice C's limited memory utilization, although no worse than other available compilers', is a real disappointment. No single data object (should I call this a datum?) may be greater than 32K bytes, and the total data space (including stack and heap space) is limited to 64K. Similarly, 64K is reserved for machine code. Many otherwise fine application programs currently on the market, principally word processors and spreadsheets, are limited by their small data space. This is in part because no available compiler allows programmers to easily access the full complement of RAM. A compiler that actually supported the full megabyte addressing of the 8088 chip would be a real boon; Lattice C does not.

THE LATTICE manual is very good indeed. All my questions had been anticipated and were answered.

The Lattice manual, on the other hand, is very good indeed. I was impressed by the fact that all my questions had been anticipated and were answered. What's the maximum object size? 32K. The floating point format? IEEE. How do I pass arguments to an assembly language sub-

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routine? This is thoroughly explained. The manual includes both a table of contents and an index. The compiler's error messages are listed and explained. The code generator is outlined, as are the

THE C-FOOD Smorgasbord is an optional package that includes a few bad puns and several handy functions.

workings of the library functions.

One of the biggest headaches in switching to a new compiler, even if you're familiar with the language, is discovering all the little implementation dependencies. The Lattice C manual does an outstanding job of reducing this difficulty. It presents a point-by-point comparison with the Kernighan and Ritchie standard. This is the best manual I have seen for any C compiler available for the PC. The Kernighan and Ritchie book is included with the compiler—another nice touch.

Function Libraries

The C language makes no provisions for input or output to files, the keyboard, or the screen. These vital functions are to be provided by a library of subroutines or functions. Portability considerations make a standard, UNIX-compatible library very desirable, and this is exactly what Lattice delivers. The function library supplied with this compiler contains the complete UNIX-compatible standard functions, plus a few more. These extra functions, which include pattern matching and parsing utilities, would be useful in writing a command processor or a compiler's lexical analyzer. The source code for the library is not supplied with the compiler, but can be obtained for an additional charge.

No PC-specific functions are supplied with the compiler, but some can be found in the C-Food Smorgasbord, an optional package (available for an additional charge) that includes a few bad puns and several handy functions to help developers get their C-legs. (The Smorgasbord manual assumes you appreciate low humor; those who can't stomach C-puns might find themselves getting C-sick.) The Smorgasbord functions are divided into several categories.

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2. Low-level, unbuffered, byte-oriented I/O functions for keyboard input, screen output, printer output, and asynchronous communications. These simply call operating system routines.

3. Low-level, unbuffered, byte-oriented I/O functions that do more or less the same things as the above functions, but do so by calling the ROM BIOS routines and device drivers instead of the operating system's routines. Close control of the display is possible using these functions.

4. Another set of functions to make working with terminals easier. Remember terminals? Older microcomputer systems were often hooked up to completely separate terminals. Since the brand of terminal differed from system to system, the programmer was left with the nasty problem of making a program work with many dif-

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Figure 1: Benchmark results for three C compilers. Results for IBM's Pascal and BASIC are included for comparison.

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COMPILER	Large Compile	Compile	Runtime	.exe File Size
Lattice C	3:10	1:05	0:11.1	19,328
c-systems C	15:15	1:28	0:15.0	24,960
CI-C86	4:02	1:25	0:17.3	12,672
IBM Pascal (compiled):			0:12.0	32,512
IBM BASIC (compiled, standalone):			0:16.0	18,432
IBM BASIC (interpreted):			33:67.0	na

necessary to drive an attached terminal. However useful this may have been 3 years ago, most new microcomputers (like the IBM PC) feature integrated, memory-mapped displays. The TIP is unnecessary in dealing with recent computers.

5. Finally, the Smorgasbord includes several miscellaneous functions that provide such services as file directory manipulation and access to the system clock.

Documentation for the Smorgasbord is not up to the level of the compiler's; in particular, the explanation of the Terminal Independence Package is quite sketchy. Also, the Smorgasbord and the compiler predate PC-DOS 2.0; gaining access to the newer PC-DOS function calls and hierarchical directories remains a task for the programmer.

Speed Tests

It is a truism among programmers that the speed of one's program depends mostly on the sophistication of the algorithm; other factors, including the speed of the compiler, are secondary. Nevertheless it is desirable to squeeze every bit of performance out of the computer, and an efficient compiler helps. To get some idea of Lattice C's efficiency, I ran a couple of benchmark tests.

The algorithm used for the run time and file size comparisons in Figure 1 is the popular Sieve of Eratosthenes prime number calculation, the same algorithm used in "A High-Level Language Benchmark" (*Byte*, September 1981). This was a very small program (about 30 lines), so compilation times were near the compiler's minimum. The compilation time figure includes time for linking the executable file. Note that the size of the file does not reflect the compactness of the compiler output; it depends mainly on the size of the library routines automatically linked into the file. The Large Compile benchmark measured the compilation and linking time of a 500-line C program; the other three figures apply to the Sieve program.

Judging from these results, programs are compiled faster by the Lattice C compiler, and it produces programs that run faster than any other C compiler available for PC-DOS.

Comparing the Compilers

Given that Lattice C compares favorably in speed and quality to the best of the previously reviewed compilers, which should you choose? The Computer Innovations Compiler, CI-C86, doesn't have the same level of polish, and doesn't run as fast, but it also supports the full C language. In fact, it comes closer than Lattice C to meeting the Kernighan and Ritchie specifications. It comes with a somewhat larger library of functions, including trig functions and Intel 8087 support functions, and the source code for these functions is included at no extra charge. Its error messages are not documented, but the compiler's checking algorithm is

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smarter—it produces few spurious messages. The author of CI-C86 is known for being easily accessible; technical support for Lattice C is provided by Lifeboat Associates, not the authors. On the negative side, CI-C86 uses a nonstandard linker, which makes interfacing to assembler routines awkward. Both of these compilers are widely used, and each has its fans. The CI product, though, is less expensive.

A desirable compiler of a very different sort is the c-systems product. It produces assembly language files that must then be run through the IBM Macro Assembler. This is beneficial if you need to integrate C programs with assembler programs, but it's generally a severe disadvantage as compilation will take significantly longer. The most interesting feature of the c-systems compiler is its extra-cost c-window package, a symbolic source-level debugger that allows you to trace a C program as it runs. There is a very definite trade-off here between those compilers that run quickly (which allow you to easily recompile and experiment frequently to find bugs), and the c-systems package (which is slower at compiling but helps you find a bug usually after one compilation). Take into account your personal debugging style in evaluating the desirability of such a tool. Note that the c-systems compiler does not support the full language—floating point support and the cast operator are its most notable omissions.

Which of these three C compilers do I prefer? As much as I like the source level debugger provided by c-systems, I prefer a compiler that runs quickly. Choosing between Lattice C and CI-C86 is more difficult. For me, the standard object files, the extra polish, and the speed of Lattice C make it a more desirable compiler. */PC*

Product Information

In addition to Lifeboat Associates' Lattice C Compiler, the following C language compilers are discussed in this review.

CI-C86
Computer Innovations, Inc.
10 Mechanic St., #J
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List Price: $395; documentation only, $35
Requires: 96K, PC-DOS, two disk drives.

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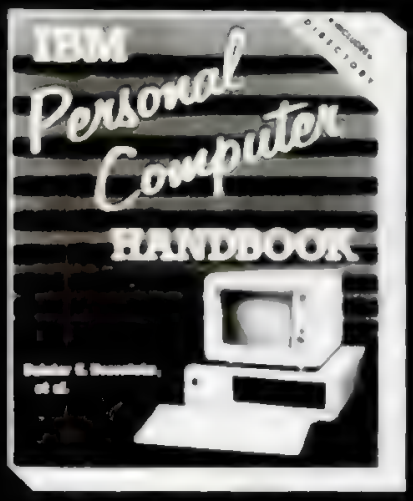
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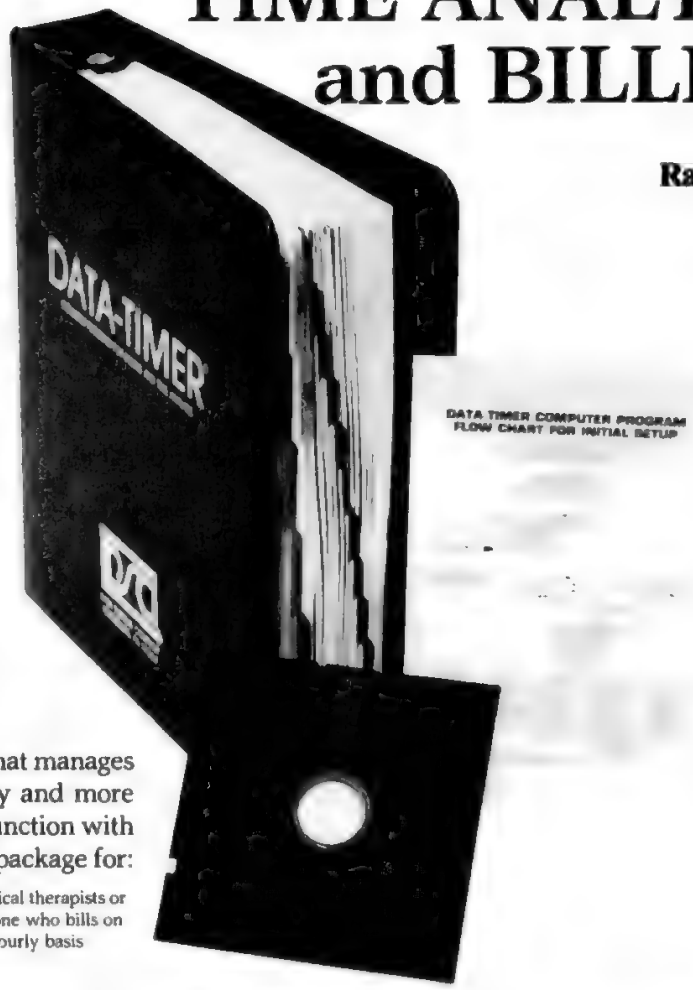
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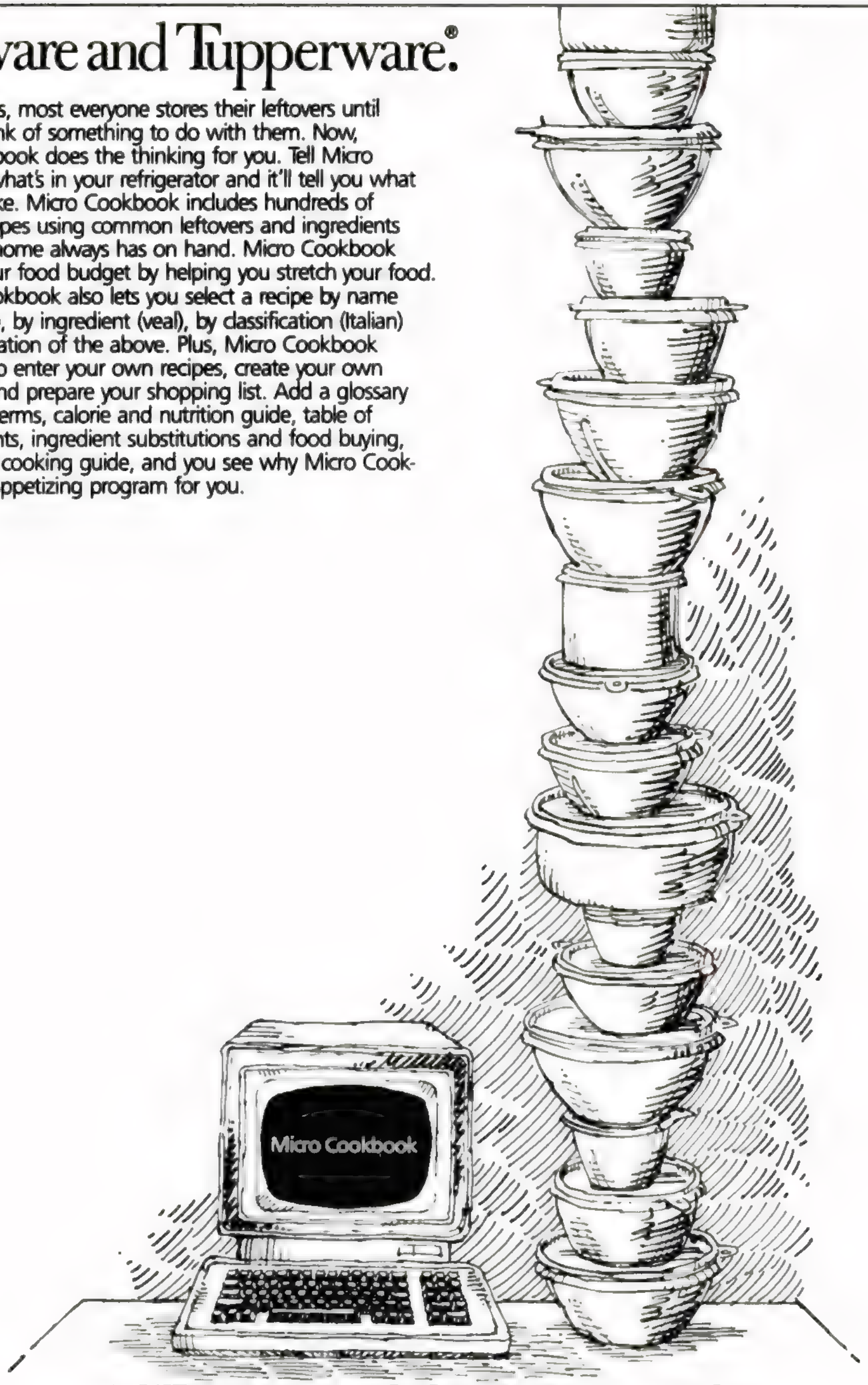
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Why should all these things happen? Why are they so common? Can anything be done about it? And if so, by whom?

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At some point the retailer gets the product. Because this is the end of the distribution chain and the point of customer contact, the retailer must provide certain services to support the marketing, presale, sale, and post-sale phases of getting the product into the hands of the ultimate consumer. The retailer desires very much to be paid for this service, and we have for centuries agreed that such an arrangement is fair.

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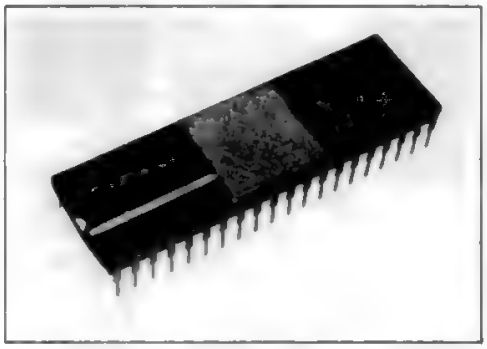
output from *GalacticCalc*, put it through *DataUniverse*, and print mailing labels with *CometList*? Um, I'm not sure, let me ask . . ." Worse, these responses are usually given in code, as in, "Sure you can, no problem!" accompanied by an utterly con-

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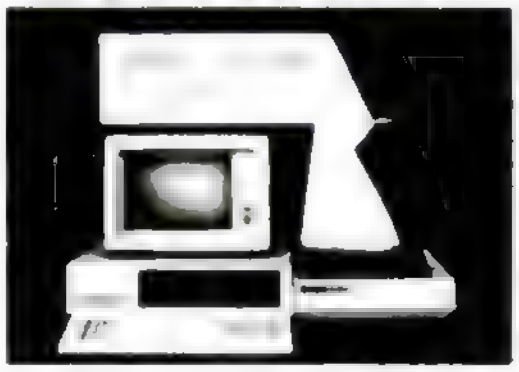
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vincing smile.

To provide solid answers to what seem like simple questions, but that usually involve complex issues, the retailer needs people with experience *and* intelligence. This costs money, and lots of it, more money than the average retailer can afford. The buyer can get it, if he or she can pay for it. However, I think the average buyer will be reluctant to pay $6,000 for a $5,000 computer just to know that the person with all the answers works at the store.

Okay. Let's say you agree that you have to pay a fair price and that the retailer is between a rock and a hard place cashwise. How do you avoid getting crushed too?

Caveat Emptor

Work. Study. Learn. Understand. It's the only way.

Being wary of the retailer will only work as a strategy if you know what you are talking about. When I opened my box to find 16K chips, I knew what they were. If I hadn't, they would have been plugged in and the system would have failed. This is a pretty small detail, and one a buyer shouldn't have to worry about, but knowing it saved me time.

The case of the chips is a good one for a number of reasons. My purchase order clearly indicated what was desired: the newest model of PC with 256K capacity on the system board, 256K installed. I didn't get them installed and I didn't get the right components. But I'm on solid ground here, because I knew how and what to order in the first place; that order was not open to interpretation. Fighting the installation is, unfortunately, a waste of time because I need the machine more than I need the hassle. The machine is no good to the office without the memory, though, so I raised a stereophonic fuss and let everyone know about it.

The key here is that I knew in advance what I needed, what I wanted, and how it all went together. That's exactly what I ordered, in detail. When I didn't get what I ordered, I knew it and took action to correct the situation, using the initial order as my primary weapon.

Any buyer can do this, with the proper amount of time and study, and in advance. Put the retailer on the spot, ask tough questions, demand answers, and work to get what you want. Although the relationship may seem to be an adversary one, the process can be civil and courteous. It's simply up to you to make sure you get what you pay for.

But is it fair?

Consider it a different way. Toys "Я" Us is now selling computers, and judging by the way the store displays are growing in size and sophistication, and by the number of different models sold, I'm convinced that it is selling plenty of them. How much support can you expect from a toy store? The answer is, very little, and this isn't unreasonable. In fact, it is exactly the same answer you would get if you asked what kind of support the store gave on a Mattel electronic toy. The toy store might replace a defective unit with a working one, but unless luck is on your side, the store personnel will probably not be able to tell you how to play the game. They are also not going to be able to tell you how to work your far more complex computer system.

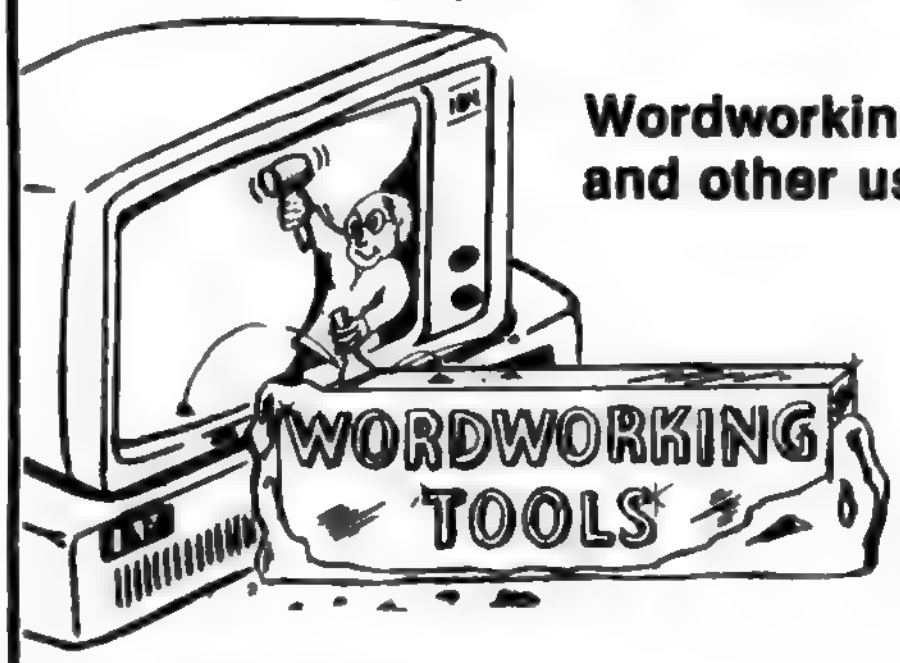
The retail complexity of the PC is far greater because the hardware and software systems available for it, and the applications to which it will be put, are themselves far more complex. The retailer is certainly in a different category than a toy salesperson, but we are talking about overwhelming complexity. In many cases, the retailer probably can't even answer basic questions about everything in the store's product line, much less questions about recently announced products or that special whizbang you absolutely must have.

IBM seems to be attacking this problem with its Customer Support System (CSS), a program that can give automated demonstrations of IBM software and provide some information about hardware and software products. At the moment, the CSS database is very skimpy, and completing it will be a formidable task. What retailers should have is a system that would allow them to dump two warm salespersons and replace them with a single, more highly-paid human expert. Don't hold your breath.

It is wrong to give the impression that all retailers share these traits and problems. Some stores are staffed with very helpful and well-informed personnel. Regardless of how good the store is, you can improve the situation by educating yourself as much as possible before you decide to buy.

And remember, you really do get what you pay for. */PC*

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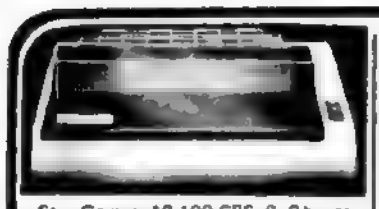
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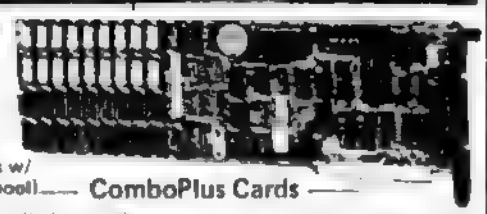
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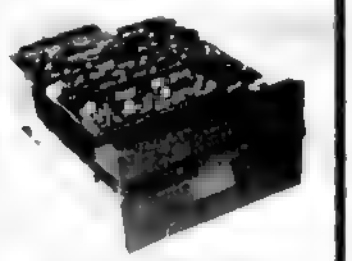
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entered the following numbers: 00 BA 79 24 B7 07 B8 00 C6 CD 10 BA 00 00 B7 00 B4 02 CD 10 C3. When you've finished, press Return.

5. At the prompt, type W.

6. When the prompt reappears, type Q.

You are now ready to test the program. Type CLS. The screen should clear and the PC-DOS prompt appear in the upper left hand corner. If it doesn't work, delete CLS.COM from your directory and repeat the process, taking care to enter the numbers correctly.

Gerald Green
Fort Worth, Texas

Hi-Res Color Trick

When I first saw a demonstration of Microsoft's *Flight Simulator* I was surprised at the brilliant colors on the composite monitor—the high-resolution graphics mode that this program uses is only supposed to be in black and white. I was further mystified by the absence of color when the same program was run on an RGB monitor. After some investigation, I found that Microsoft had simply exploited a quirk of the color/graphics adapter board.

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The BASIC program in Figure 2 shows how you can generate colors in high-res

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EDITED BY BILL MACHRONE

Programming tips and insights into bugs are shared by members of the PC users community.

User-To-User

This month we have a number of helpful hints and nifty fixes to make you and your PC happier. A solution that makes random numbers more random, a BASIC program that creates a .COM program in machine language, and a neat dBase II *fix.*

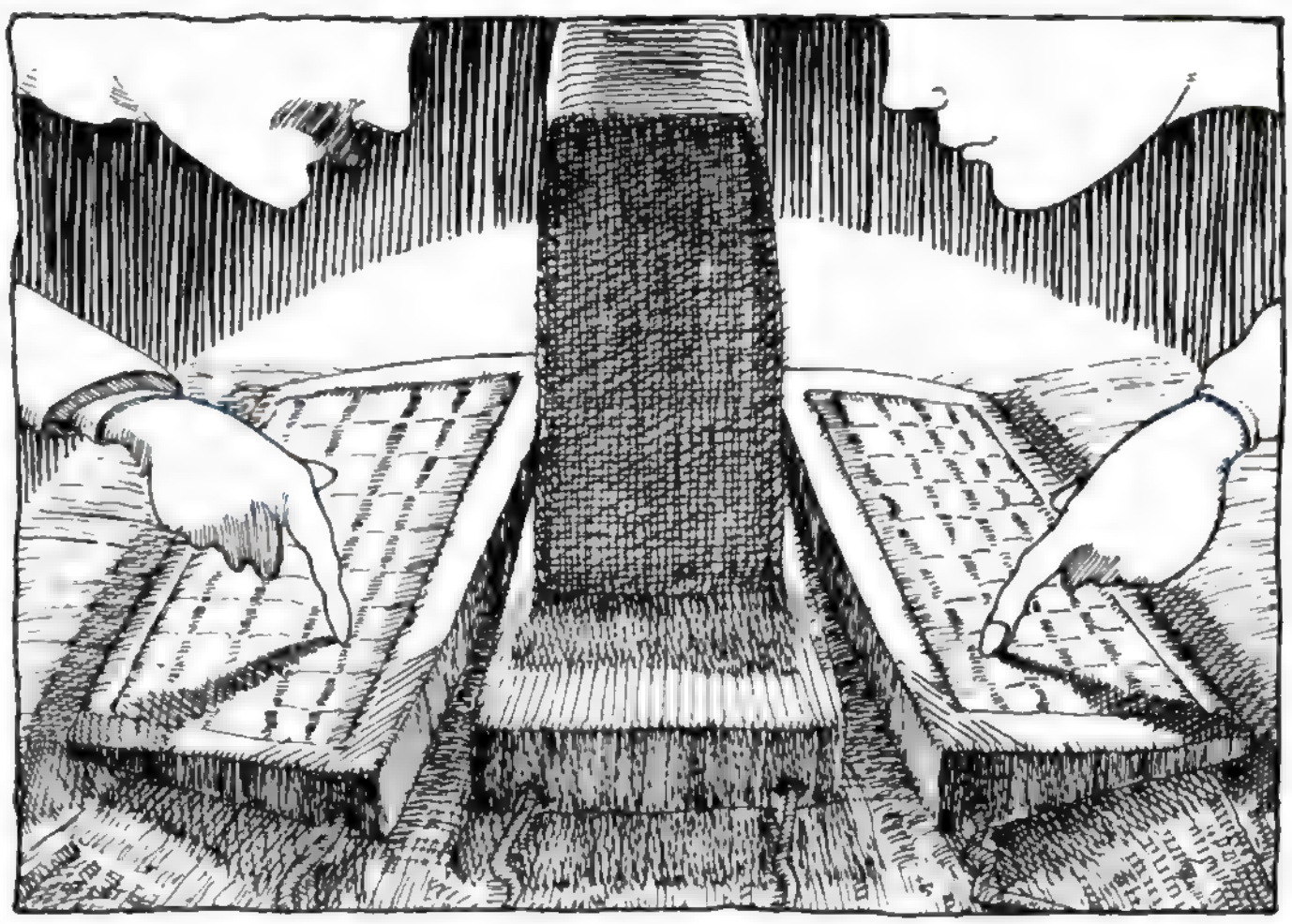
Going to Seed

The random number generator in BASICA, invoked by the RND command, always starts with the same seed number. The next number that RND produces, while apparently random and bearing no relationship to the first number, will be the same every time you use RND. And so forth.

An application program I was writing required a truly random number so that the machine's action could not be predicted nor the program be manipulated. I tried using RANDOMIZE(n), providing a new seed number from the value of (n). The first time I ran it, everything looked OK—the number series that RND generated was new. The second time I tried it, though, it repeated the new sequence once again.

What I needed was a way to put a truly random number into the RANDOMIZE statement so that the RND command would be reseeded every time the program was run. My solution was to use a counting loop that is interrupted by the user's response to an on-screen question. The number in the counter (A) at the moment a key is pressed becomes the new seed for the random number generator. The listing in Figure 1 gives an example of how to implement this capability in your programs.

Paul Burck
Lakeville, Minnesota



I REQUIRED a truly random number so that the machine's action could not be predicted.

This is a decent way to get BASIC to produce a random number. The only change I might make in the listing is to add an additional test in the loop body:

```
IF A = 32000 THEN A = -32000 .
```

This would allow the loop to run "forever" if the user were slow to respond.

CLS-sy Idea

Have you ever wished that BASIC's CLS command worked while you were in PC-DOS 1.1? Lots of people must have, because screen clearing now is a feature in

Figure 1: A program, written in BASICA by Paul Burck, that generates true random numbers.

```
 10 WIDTH 80 : CLS
 20 A = 0 : X = 0 'initialize variables
 30 LOCATE 7,30 : PRINT "WELCOME TO EXAMPLE!"
 40 LOCATE 9,17 : PRINT "(Here begins a screen display of
    instructions."
 50 LOCATE 11,14 : PRINT "Three or more lines allows enough
    time to elapse for"
 60 LOCATE 13,15 : PRINT "variation in RND generated with each
    program run.)"
 70 LOCATE 19,23 : PRINT "Press space bar to continue. . .";
 80 FOR A = -32000 TO 32000 'start timer loop
 90 T$ = INKEY$ : IF LEN(T$) = 0 THEN NEXT A
100 CLS : LOCATE 10,25 : PRINT "HOW MANY PEOPLE ARE PLAYING ";
110 INPUT N
120 RANDOMIZE(A)
130 X = INT((RND)*N)+1
140 LOCATE 16,35 : PRINT "RND = ";X
```

PC-DOS 2.0. Here is a machine-language answer to your prayers. It is created using DEBUG. Don't be scared if you haven't used this utility before. Just follow the instructions below and you'll have the program running in no time.

1. Load DEBUG. When DEBUG loads, it will prompt you with a dash.

2. Type N CLS.COM.

3. When the prompt reappears, type RCX. DEBUG will respond,

CX 0000

:

Type 17.

4. At the next prompt type E100. You will see:

04B5:0100 xx.

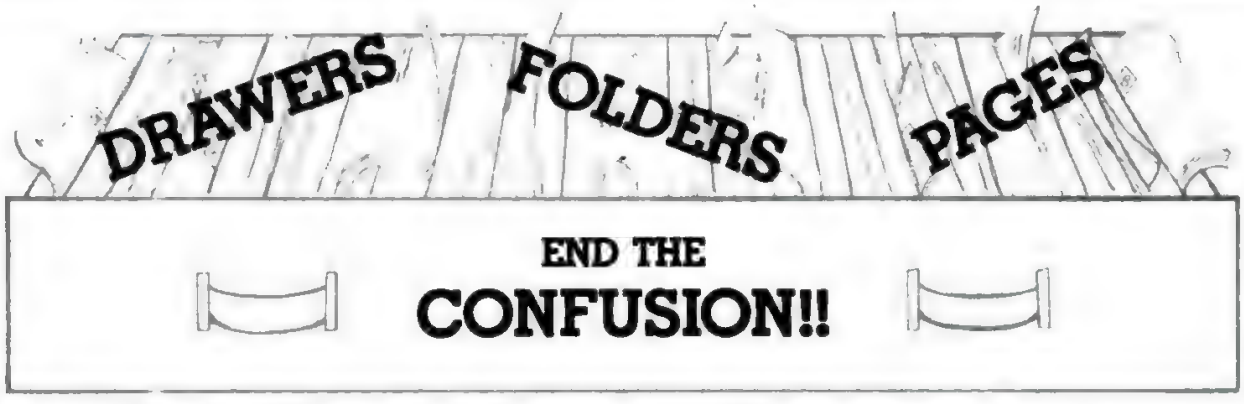
(xx will be some hex number.) Don't be concerned if the first four digits, the memory segment, are different; this value is based on the amount of memory in your system.

Now type B9 and press the space bar.

HAVE YOU ever wished that BASIC's CLS command worked while you were in PC-DOS 1.1?

Two more hex digits will appear. When they do, type 00. Press the space bar and two more digits will appear.

Continue this procedure until you have



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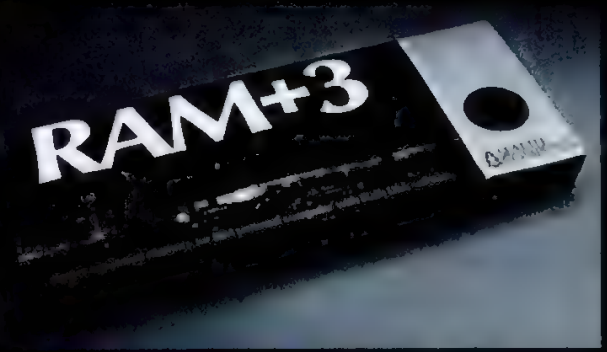
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Figure 2: A program to demonstrate colors generated in high-resolution graphics mode, written by David F. McManigal.

```
10 SCREEN 2: WIDTH 80: KEY OFF: CLS  'DEFINE HI-RES GRAPHICS SCREEN
20 OUT &H3D8,&H1A                    'DISABLE MONOCHROME OVERRIDE
30 LOCATE 20,2                       'POSITION TO PRINT BINARY VALUES
40 PRINT "0000 0001 0010 0011 0100 0101 0110 0111 ";
50 PRINT "1000 1001 1010 1011 1100 1101 1110 1111"
60 FOR COLR=0 TO 15                  '16 COLOR VALUES CAN BE DISPLAYED
70 FOR N=0 TO 9                      'USE 40 PIXELS/COLOR
80 X=(40*COLR)+(4*N)                 'SET X-AXIS REFERENCE
90 IF COLR>7 THEN LINE (X,0)-(X,150) 'DISPLAY VERTICAL LINE ----
100 IF COLR AND 4 THEN LINE (X+1,0)-(X+1,150) 'MINIMUM SPACING IS ONE
110 IF COLR AND 2 THEN LINE (X+2,0)-(X+2,150) 'PIXEL AT 14MHZ, OR 1/4
120 IF COLR AND 1 THEN LINE (X+3,0)-(X+3,150) 'PERIOD OF 3.58MHZ
130 NEXT N: NEXT COLR                         'COLOR CARRIER.
140 END
```

Figure 3: A listing of instructions for dBase II that change the way data is displayed, written by Rick Bernauer.

```
* DISPLAY.PRG - ALLOWS THE USER TO SELECT VIDEO ATTRIBUTES FOR
* THE IBM PC.
SET TALK OFF
DO WHILE T
ERASE
STORE 'This is a test attribute' TO Mtest1
STORE 'Press Return to try another.' TO Mtest2
@ 5,5 SAY 'This program allows you to change the way your PC'
@ 6,5 SAY 'displays data fields, gets phrases, etc.'
@ 8,5 SAY 'Enter the number of the highlight mode you'd like to see'
@ 10,10 SAY '1. Reverse Video'
@ 11,10 SAY '2. High Intensity'
@ 12,10 SAY '3. Underlined'
@ 13,10 SAY '4. High Intensity Underlined'
@ 14,10 SAY '5. Blinking'
@ 15,10 SAY '6. No Enhancement'
@ 16,10 SAY '7. End this demonstration.'
@ 17,1  SAY ' '
WAIT TO Choice
DO CASE
   CASE Choice = '1'
    POKE 1047,112
   CASE Choice = '2'
    POKE 1047,15
   CASE Choice = '3'
    POKE 1047,01
   CASE Choice = '4'
    POKE 1047,09
   CASE Choice = '5'
    POKE 1047,135
   CASE Choice = '6'
    POKE 1047,07
   CASE Choice = '7'
    SET TALK ON
    CANCEL
ENDCASE
@ 20,1 GET MTEST1
@ 21,1 GET MTEST2
READ
ENDDO
```

mode. Line 20 disables the "B/W" signal by setting the MODE register to 1A hex instead of the normal 1E. The binary numbers in lines 40 and 50 define the left-to-right line positions, then the FOR-NEXT loop draws a 16-bar color chart on a composite monitor.

This technique is of limited practical value, but it does permit the intermixing of 80-column alphanumerics and color graphics. Characters will be arbitrarily or randomly colored. Small objects will not be colored properly (as evidenced already by the characters), but large areas, such as those found in the *Flight Simulator*'s display, are beautifully rendered. In fact, this technique produces more varied and more brilliant colors in large areas than may be had conventionally.

David F. McManigal
Stormville, New York

dBrightness in dBase

Data being edited by *dBase II* is displayed in reverse video. Many people find the brightness of reverse video to be hard on their eyes and use the SET INTENSITY OFF command to eliminate it. Then they find that the colons bracketing the fields don't offer enough guidance for their eyes, making the screen hard to read.

There is an undocumented POKE instruction in *dBase II* that allows you to modify memory from within your *dBase* programs. The byte that specifies the way your monitor displays highlighted information is at 0417 hex or 1047 decimal. You can set this byte to values other than the one that *dBase II* uses to initialize your PC. The program in Figure 3 uses POKE to demonstrate the alternate display possibilities.

Rick Bernauer
Independence, Missouri

I ran this program on a number of machines and found that all the IBM compatibles handled the POKE correctly. Some of the modes looked a little strange on the color monitor, but the net effect is there. I would be remiss in not cautioning readers against using undocumented features in software. There is no guarantee that they will be there in the next release. In the meantime, your eyes should appreciate this byte of extra control.

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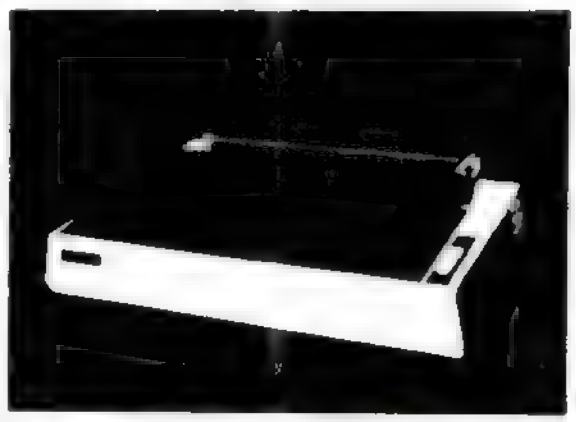
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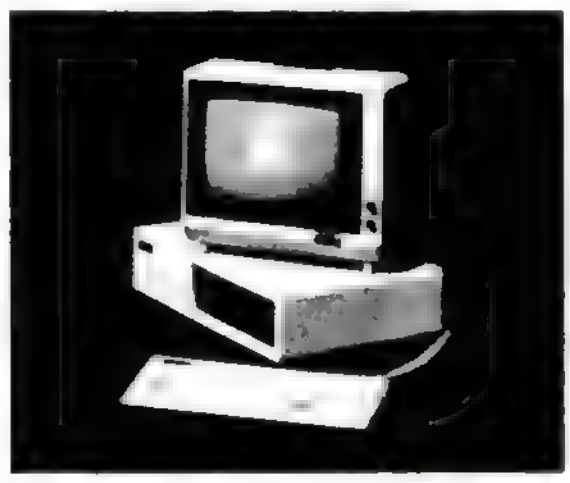
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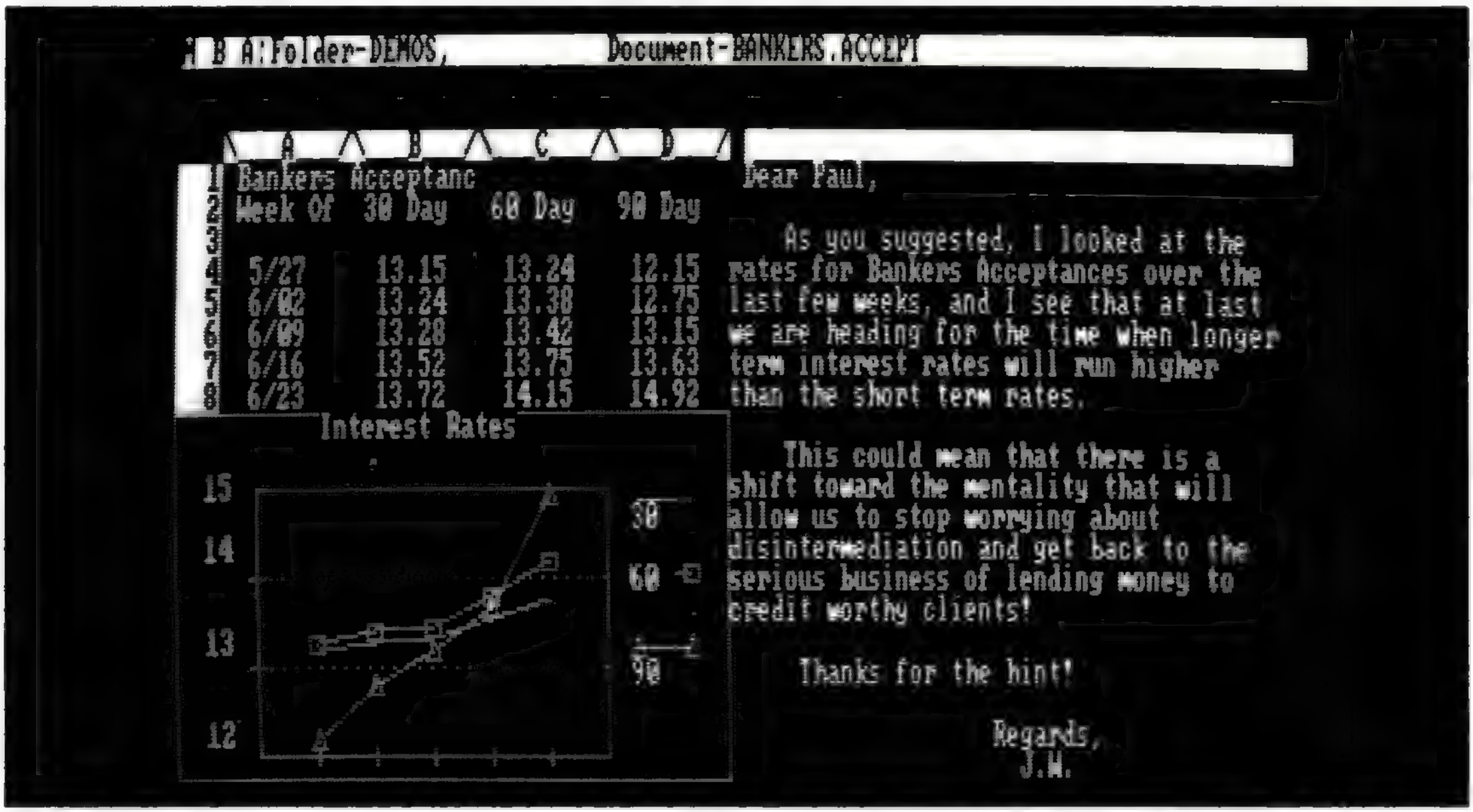
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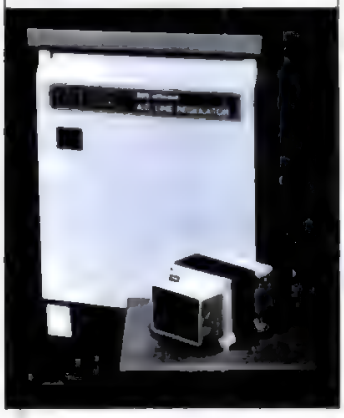
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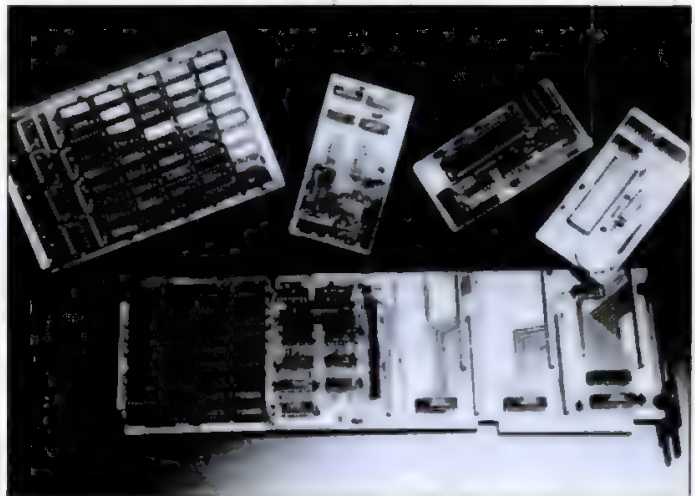
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CIRCLE 685 ON READER SERVICE CARD

PC-MATE IEEE488

An interface circuit board including both the Intel 8291A and the 8292 integrated circuit set. The board provides talker, listener, and controller capabilities on any size IEEE488 system, including those linked to other computers. The board allows data transfers using either programmed I/O or direct memory access and provides a variety of user selectable interrupts. Its data transfer rate is programmable, and it provides complete source or acceptor handshaking plus talker and listener functions. Handshaking is handled automatically using the standard IEEE488 bus protocol.

Optional PC-DOS compatible software permits both direct memory access and interrupt lines to be software-disconnected, allowing multiple devices to share the same lines. A software interface from BASIC and other high-level languages is included in the software support package, giving users the option of compiling for faster execution.

(List Price: $395; software support package, $95)

Requires: 64K, one or two disk drives, MS-DOS 2.0, BASIC or FORTRAN.

Tecmar, Inc.
23600 Mercantile Rd.
Cleveland, OH 44122
(216) 464-7410
Telex: 241735

CIRCLE 680 ON READER SERVICE CARD

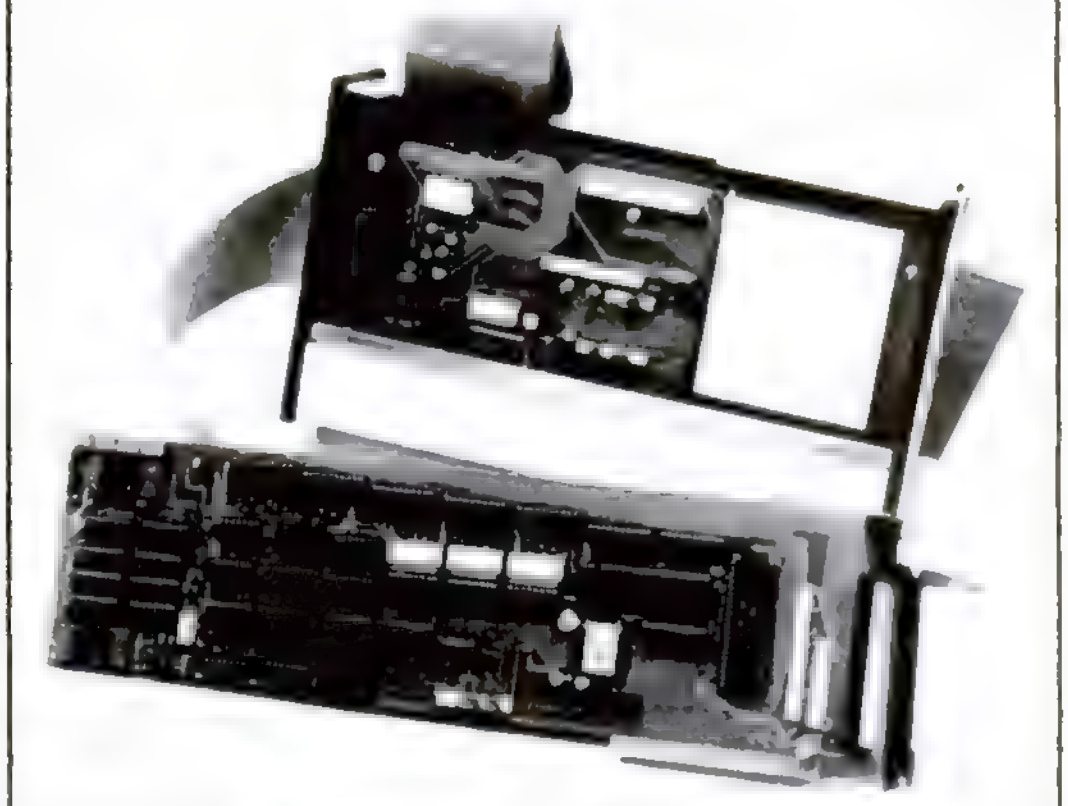
PC-MATE Lab Master

A combination add-in/add-on peripheral designed for measurement and control applications. It provides 16 channels of high-resolution analog-to-digital conversion, two channels of 12-bit digital-to-analog conversion, five independent 16-bit counter/timers, and three 8-bit parallel ports. Lab Master is capable of memory-mapped operation at any specified I/O or memory address, and the board can be strapped for either 16 single-ended or eight true-differential inputs.

Lab Master comes in two pieces connected by ribbon cable. An add-in circuit board, occupying one of the PC's expansion slots, accomplishes the necessary interface with the host computer and contains the D/A, parallel ports, and timer circuits. An outboard package includes the analog-to-digital conversion circuits. This configuration minimizes noise on the signal being digitized. *(List Price: $995)*

Tecmar, Inc.
23600 Mercantile Rd.
Cleveland, OH 44122
(216) 464-7410
Telex: 241735

CIRCLE 681 ON READER SERVICE CARD



PC-MATE Lab Master, Tecmar, Inc.

PC-MATE Speech Master

Hardware and software that provide synthetic voice output, text-to-speech conversion, and expanded native vocabulary. The Speech Master board produces two forms of speech synthesis: high-quality speech with a limited ROM-based vocabulary, and unlimited vocabulary phoneme synthesis.

Speech Master's software support operates under PC-DOS 1.1 and offers two utility programs. *ENGLISH* provides a software base for text-to-speech conversion, while *SPEAK* sends screen output to the speech synthesizer for simultaneous spoken output.

The Speech Master Auxiliary Vocabulary Unit extends the native (canned) vocabulary of the synthesis mode. *(List Price: Speech Master board $395; Speech Master software support package $95; Speech Master Auxiliary Vocabulary Unit $100)*
Requires: 64K, one disk, MS-DOS 2.0, BASIC amplifier.
Tecmar, Inc.
23600 Mercantile Rd.
Cleveland, OH 44122
(216) 464-7410
Telex: 241735

CIRCLE 682 ON READER SERVICE CARD

PC-MATE Bak-Pak

A 6.25 M disk pack containing five high-density disks. The system may be configured as either a single 6.25 M capacity drive or as five independent 1.25 M drives.

The Bak-Pak system utilizes the floppy 5/8 system adapter, which can be used to control the PC's internal disk drives. *(List Price: $1,595)*
Requires: PC-DOS 2.0.
Tecmar, Inc.
23600 Mercantile Rd.
Cleveland, OH 44122
(216) 464-7410
Telex: 24 1735

CIRCLE 673 ON READER SERVICE CARD

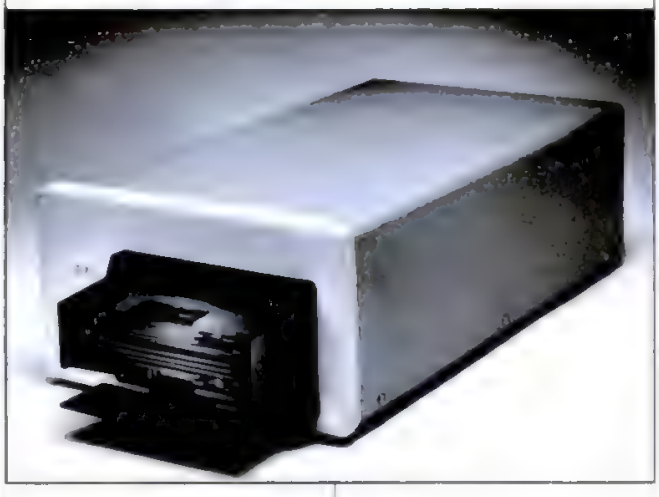
MT 180

A dot matrix printer providing high speed operation, 132-column width, and a 15-inch carriage. The unit allows the user to select a compressed printing option that provides up to 264 characters of data on a single line. Output formats, such as right-hand justification, automatic centering, print pitch, and proportional spacing, can be programmed directly through front-panel controls as well as through the user's computer. Both serial and parallel interfaces are included in the unit.

The printer operates at 160 cps for report and spreadsheet preparation, and at 40 cps for letter-quality printing. *(List Price: MT-180I $998; MT 180L $1,098)*
Mannesmann Tally
8301 S. 180th St.
Kent, WA 98032
(206) 251-5503

CIRCLE 674 ON READER SERVICE CARD

PC-MATE Bak-Pak, Tecmar, Inc.



Touch Information Display (TID)

A standard ASCII terminal with touch-sensitive display, allowing user to interact with programs by touching proper points on the screen. The TID relies upon arrays of light-emitting diodes and phototransistor detectors around the periphery of the screen. Outputs result when criss-crossing beams of infrared light are interrupted.

The 12-inch diagonal, amber-phosphor screen displays 24 lines of 80 columns each. Touch areas, however, can be of any shape or size and are set up using a menu-driven routine stored in ROM. Up to 648 active touch areas can be defined. TID output resulting from a touch can be either in X-Y coordinates or one of 96 ASCII codes associated by software with a particular touch area. The unit is linked to the host computer by an RS-232-C interface at rates of up to 19,200 baud. *(List Price: $1,400)*
Electro Mechanical Systems, Inc.
801 W. Bradley
Champaign, IL 61820
(217) 359-7125

CIRCLE 688 ON READER SERVICE CARD

New On The Market

Hard Disk III

A Winchester disk drive with case, power supply, cables, and mounting hardware. Both a removable cartridge and a fixed disk model are available. Each has 5 megabyte capacity. Other available configurations include 10 M, 2 x 10 M, 15 M, and 2 x 15 M. *(List Price: $995 and up; adapter $150 and up)*

Requires: PC adapter.

VR Data
777 Henderson Blvd.
Folcroft, PA 19032

CIRCLE 683 ON READER SERVICE CARD

PIXY Plotter

A three-pen plotter that makes it possible to generate with single commands such graphics as circles, spirals, and open or closed curves. It also allows its user to expand or contract one or both axes of a graph. Built-in memory includes standard 96-character ASCII set, the Greek alphabet, special scientific characters, and nine language sets. It is compatible with such graphics programs as *BPS, Graphtalk, Curve II,* and *Transparent Data Systems. (List Price: parallel interface $795; serial interface $880)*

Mannesmann Tally Corp.
8301 S. 180th St.
Kent, WA 98032
(206) 251-5645

CIRCLE 679 ON READER SERVICE CARD

Hard Disk III, VR data



TD-1012/PC-STR

A half-inch magnetic tape subsystem featuring a start/stop mode at 12.5 inches-per-second (ips) and a streaming tape mode at 100 ips. The tape transport is available in three mounting configurations.

The recording mode is standard phase encoded at 1600 bits-per-inch. Data transfer rates are 20K bytes per second (bps) in the start/stop mode and 160K bps in the streaming mode. The unit will accept industry-standard reels from 7- to 10½-inches in diameter and stores approximately 40 megabytes of formatted data (depending on block size) on a 2,400-foot reel of tape. Included with the unit is a tape controller insertable in a vacant slot, and interconnect cables and manuals.

The TD-1012 also includes a 5¼-inch disk containing driver software for use with BASIC. Within the operating system, the user has access to 20 commands, including EBCDIC conversion. The drives will return data on 15 status conditions, allowing read/write/control for the tape system. DMA data transfer is utilized. A manual included with the package describes the tape controller installation and use of the software under BASIC. *(List Price: $4,995)*

Innovative Data Technology
4060 Morena Blvd.
San Diego, CA 92117
(619) 270-3990
TWX: 910-335-1610

CIRCLE 615 ON READER SERVICE CARD

Interface Card 50-2070

An interface card allowing its user to link two analog controllers, such as a joystick or trackball, directly to a PC's I/O slot. Card insertion features include one 15-pin D-Shell plug and one 9-pin D-Shell plug. A two-position toggle switch allows selection of either a switch-type joystick or a trackball. *(List Price: $59.95)*

Wico Corp.
6400 W. Gross Point Rd.
Niles, Il 60648
(800) 323-4014
(312) 647-7500
Telex: 28 9413

CIRCLE 672 ON READER SERVICE CARD



Model 50-2070 Interface Card, Wico Corp.



MicronEye image camera, Micron Technology, Inc.

PMS72 Hard Disk

A 5¼-inch hard disk providing 72 megabytes of unformatted storage capacity with an average access time of 30 microseconds. The integral design of the unit allows for internal mounting, and the PMS72 requires no external power supply or enclosure. Up to four of the hard disk units can be linked together.

The PMS72 supports MicroDisk's 1-DOS operating system, which runs CP/M80, CP/M86, and *Basic Four Business Basic II* application software under existing PC-DOS or MS-DOS. *(List Price: $6,200)*

MicroDisk
1422 Industrial Way, P.O. Box 1377
Gardnerville, NV 89410
(702) 782-8105
(702) 883-8445
Telex: 18 2737
Source: CL0922

CIRCLE 614 ON READER SERVICE CARD

TG-3135 and TG-3170

Two high capacity hard disk drives, the TG-3135 and TG-3170, have 35M and 70M formatted hard disk capacity respectively. Both PC-compatible devices have an integral tape backup device using DC600 ANSI standard tape cartridge. *(List Price: TG-3135 $5,595; TG-3170 $6,595)*

Tallgrass Technologies Corp.
11667 W. 90th St., P.O. Box 12047
Overland Park, KS 66212
(913) 492-6002
Telex: 21 5406 TBYT UR

CIRCLE 687 ON READER SERVICE CARD

The TG-3170 Hard Disk Drive, Tallgrass Technologies



Wizard EBI-Serial

A buffer for Epson MX and FX printers. The unit features switchable baud rates from 500 to 9,600 baud and does not require additional interfaces to the user's system or to the printer.

Minimum buffer available is 8,192 characters, and the unit can be upgraded to 16K, 32K, or 64K with optional memory components. *(List Price: $216)*

Wesper Microsystems
14321 New Myford Rd.
Tustin, CA 92680
(714) 730-6250

CIRCLE 613 ON READER SERVICE CARD

MicronEye

An image camera capable of 256 x 128 resolution and operating speeds of up to 15 frames per second. The MicronEye transmits images into the computer's memory, enabling machine users to store and display graphics, and analyze images. It also provides for robot vision, text recognition, and pattern analysis. Sample programs and driver routines, including source code, are included on an accompanying disk. *(List Price: $295)*

Requires: 64K, one disk drive, PC-DOS, color graphics card.

Micron Technology, Inc.
2805 E. Columbia Rd.
Boise, ID 83706
(208) 383-4000

CIRCLE 684 ON READER SERVICE CARD

Copyrighted material

New On The Market

TG-4020 and TG-4045

Two streaming cartridge tape backup devices for use with the PC-XT. The TG-4020 is a 20M tape backup system that can stream data or selectively backup and restore data from a PC-XT hard disk drive. The device uses an ANSI standard DC-300XL tape cartridge.

The TG-4045 is a 45M version, which backs up data on a DC-600 cartridge in a streaming mode or file-by-file mode. Both devices are capable of emulating the PC-XT's BACKUP and RESTORE commands, allowing users to operate the devices with standard command syntax. *(List Price: TG-4020 $2,195; TG-4045 $2,495)*

Tallgrass Technologies Corp.
11667 W. 90th St., P.O. Box 12047
Overland Park, KS 66212
(913) 492-6002
Telex: 21 5406 TBYT UR

CIRCLE 686 ON READER SERVICE CARD

The TG-4045 Streaming Tape Backup, Tallgrass Technologies



Model 3200 Diskette Duplicator

A disk duplicating device that works with existing duplicating software in single- or double-sided, single- or double-density formats. The unit is capable of unattended Pass/Reject sorting of disks into bins.

The Model 3200 connects to the user's system through an ANSI interface for the disk drive and an RS-232C interface for the CPU. *(List Price: $4,995)*

Mountain Computer, Inc.
300 El Pueblo Rd.
Scotts Valley, CA 95066
(408) 438-6650
TWX: 910-598-4504

CIRCLE 675 ON READER SERVICE CARD

SOFTWARE

Qbase

A filing system/database program, providing automatic data entry checking and an embedded calculator. Checking features can compare to master lists, trap invalid alphabetic sequences, enforce entry of mandatory data, and ensure that alpha/numeric data lie within specified ranges. The embedded calculator permits user to temporarily exit the form to perform calculations, then insert the result within the appropriate field using only two keystrokes.

Field searches can be conducted using OR and AND criteria simultaneously, and the report-writing feature allows reports to be generated in detail or summary. *(List Price: $189)*

Requires: 128K, two double-sided disk drives, Pascal.

Applied Software Technology
170 Knowles Dr.
Los Gatos, CA 95030
(408) 370-2662

CIRCLE 661 ON READER SERVICE CARD

Galactic Gladiators

A game program where sixteen different alien creatures confront each other on a variety of battlefields. Each alien is rated for strength, dexterity, endurance, experience, and weapons skills. Weapons available include stun wands, vibro knives, laser swords, disruptors, gapers, and heat gun rays. A variety of game scenarios are available. *(List Price: $39.95)*

Requires: 64K, one disk drive, color/graphics card, display.

Strategic Simulations, Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
(415) 964-1353

CIRCLE 645 ON READER SERVICE CARD

Screen Writer Program

A program to create and save up to 32,000 screen formats via on-line commands designed for novices. Besides its basic function of field selection, the program also can perform data entry, with up to 30 equations with basic arithmetic operators, and can select fields to be updated, check input errors, and perform "what if" actions.

A transaction processor is also included to read the screen format file created by the screen writer. It allows a fill-in-the-form approach for data entry. *(List Price: $98; manual only, $10)*

Requires: 64K, dual disk drive, PC-DOS, monochrome display.

Micro Architect, Inc.
96 Dothan St.
Arlington, MA 02174
(617) 643-4713

CIRCLE 646 ON READER SERVICE CARD

WISC-R Report Writer

A program for psychologists, counselors, and others familiar with intelligence tests, to help diagnose the academic strengths and weaknesses of students, and to prepare printed reports of the results for school personnel and parents.

The program includes a test profile illustrating the subtest scaled scores, and aids in the selection of appropriate recommendations. Generated reports describe each subtest administered and give percentile ranges for each student's score. *WISC-R Report Writer* measures five areas and produces a listing of over 50 recommendations. *(List Price: $125)*

Requires: 64K, one disk drive, printer.

Bertamax Inc.
101 Nickerson #202
Seattle, WA 98109
(206) 282-6249

CIRCLE 655 ON READER SERVICE CARD



Quarterdeck DesQ, Quarterback Software

Quarterdeck DesQ

An operating system that allows users to integrate and run software from different publishers simultaneously. Using several windows displayed together on the screen, the user can transfer data between programs, run programs separately and merge results, and customize program-running operations automatically.

User can configure the various windows on the display screen to any size and/or position on the screen. Windows can overlay other windows or can be "put aside" or hidden until needed. *DesQ* also allows user to teach it the various steps of a multi-program operation, after which *DesQ* will repeat steps automatically. *(List Price: $395)*

Requires: 256K, 5M-byte hard disk drive, display.

Quarterdeck Software
1918 Main St. #240
Santa Monica, CA 90405
(213) 392-9851

CIRCLE 670 ON READER SERVICE CARD

Delta-DSS

An analytical business workstation program that utilizes historical, regional, and forecast data supplied by Evans Economics, Inc. (EEI) to produce economic and financial analyses.

The integrated functions of *Delta-DSS* include: *DeltaData*, an economic and financial database manager; *Delta-Planner*, a financial modeling and reporting spreadsheet; *Delta-Stat*, a statistical analysis and time series forecasting and modeling program; *Delta-Graph*, which provides high-resolution color graphics and light pen support; *DeltaText*, a word processor, and *Delta-ENS*, an economic and financial electronic newsletter.

The economic information that EEI offers come in the form of *DataPacs*: historical data and forecasts pertaining to specific industries and markets. *Core DataPacs* contain 400 historical data series and 100 forecasts for each of 20 domestic industries and seven international industries. *Profile DataPacs*, containing 20 to 150 historical series and forecasts, are also available.

EEI also offers database access, with hard disks containing over 4,000 time series plus forecasts.

Core DataPacs are offered on floppy disks or via an autodialed data link, and are updated monthly or quarterly by mail or data link. The database hard disks are updated monthly or quarterly with floppy disks by mail. *Profile DataPacs* are only available via an autodialed data link. *(List Price: $2,000)*

Requires: 128K, one disk drive and one hard disk, MS-DOS 2.0, Intel 8087 co-processor, color graphics card, printer, light pen.

Evan Economics, Inc.
1211 Connecticut Ave., N.W. #700
Washington, DC 20036
(202) 467-4900

CIRCLE 664 ON READER SERVICE CARD

New On The Market

Point of Sales

A menu-driven inventory control program designed for service centers, bicycle shops, motorcycle shops, automobile dealerships, and other establishments. The program keeps track of items sold in the current month, quarter, and year. It also keeps track of total taxable and non-taxable sales, taxes collected, cost of goods sold, and gross profit for the current day, week, month, and quarter, as well as for the previous year.

Item numbers can be alphanumeric, up to 15 characters long. Four pricing levels are also supported: cost, sales, list, and exchange.

Point of Sales also prints reorder, out-of-stock, lost sales, non-selling items reports, and sales summaries. These may be printed by specified vendor or for all vendors. *(List Price: $495)*

Requires: 96K, two disk drives, monochrome display, printer, BASICA.

Intelligent Software Systems
P.O. Box 308
Montgomery, WV 25136
(304) 442-5537

CIRCLE 652 ON READER SERVICE CARD

Spellicopter

A spelling word game program for ages six to adult. Prior to takeoff, the user is shown a list of 20 words. One by one, the user must rescue letters "stranded" on a field, organize them into the correctly-spelled words, then return the "cargo" to the landing pad. *(List Price: $39.95)*

Requires: 64K, one disk drive, PC-DOS.

DesignWare, Inc.
185 Berry St., Bldg. 3, #158
San Francisco, CA 94107
(415) 546-1866

CIRCLE 660 ON READER SERVICE CARD

Investor III

A financial analysis program for real estate professionals. It can project key evaluation criteria for up to 20 years, including annual depreciation (either straight line or accelerated); cash flow benefits (pre- and post-tax); future property values; loan balances at end of year; net equity buildup, capital gain and recapture of taxes; net proceeds from resale; after-tax return on equity (ROE); and after-tax internal rate of return (IRR). *(List Price: $249)*

Requires: 64K, one disk drive, parallel printer.

Good Software Corp.
12900 Preston Rd.
Dallas, TX 75230
(214) 239-6085

CIRCLE 654 ON READER SERVICE CARD

Business Policy Planner

A 205-page manual and accompanying disk to help businesses produce their own company policy and personnel procedures manual. *Business Policy Planner* presents 40 commonly used policies, along with commentary, legal opinion, and editing instructions.

The companion 5¼ inch floppy disk contains policy text files. When used with a word processing program such as *WordStar*, the disk permits user to edit the policy file. Disk cannot be used until the unlocking Key Code has been purchased. *(List Price: locked, $49.95; unlocked, $199.95)*

Oasis Press
1287 Lawrence Station Rd.
Sunnyvale, CA 94086
(408) 745-7093

CIRCLE 657 ON READER SERVICE CARD

PC-Logo

A PC version of the Logo language for use both as an educational tool and general applications. *PC-Logo* features programmable keys and enhanced editing capabilities. It permits communication through a serial port with devices such as a mouse.

PC-Logo comes with language disk and backup, utilities disk, tutorial and reference manual. *(List Price: $199.95)*

Requires: 64K, one disk drive, MS-DOS, Color/graphics card, color monitor.

Harvard Associates, Inc.
260 Beacon St.
Somerville, MA 02143
(617) 492-0660

CIRCLE 669 ON READER SERVICE CARD

PC LOGO, Harvard Associates, Inc.





SpeedRead+, INET Corp.

SpeedRead+

A program to learn speed-reading techniques. *SpeedRead+* includes several short stories, and a text entry feature which allows user to add new text and examinations. Four reading/training modules are incorporated, with reading speeds of 5 to 5000 words per minute. *(List Price: $79.95)*
Requires: 64K, one disk drive, PC-DOS.
INET Corp.
536 Weddell Dr., #1
Sunnyvale, CA 94086
(408) 734-0311

CIRCLE 653 ON READER SERVICE CARD

Personal Bibliographic System

A program that allows users to compile, format, and arrange bibliographies. The *Personal Bibliographic System* is a specialized word processor and database that features a screen editor, variable length fields and records, allows notes and annotations, and allows alphabetic or user-defined arrangement of citations. Punctuation of citations is according to the American National Standard of Bibliographic Citations (ANSI z39.29.1977) and the International Standard Organization (ISO). A demonstration program allowing up to 10 citations is available with the user manual. *(List Price: $250; manual and demonstration disk only, $75)*
Requires: 64K, two disk drives, 80 character display, printer.
Personal Bibliographic Software, Inc.
P.O. Box 4250
Ann Arbor, MI 48106
(313) 996-1580

CIRCLE 647 ON READER SERVICE CARD

Sayonara Scramble

A utility enabling user to "unprotect" BASIC source programs (.BAS files), allowing them to be listed and modified at will. *(List Price: $55)*
Requires: 64K, one disk drive, PC-DOS 1.1 or 2.0.
Percs Software
9734 Grant St.
P.O. Box 34357
Omaha, NE 68134
(402) 397-0361

CIRCLE 656 ON READER SERVICE CARD

GAS-PRO

A bookkeeping system developed specifically for service stations. *GAS-PRO* allows shift-by-shift checkout of the day's sales (gas and repairs), accumulating to a one-page sales summary with statistical analysis of gas sales.

The program maintains Accounts Receivable and prints customers' statements automatically, and tracks Accounts Payable with invoices for payment. Its Inventory Control functions provide a daily breakdown of parts and labor into twenty user-defined categories. The program also tracks mechanics' sales and commissions weekly or monthly.

GAS-PRO also produces a Profit and Loss statement on request, based on user-defined expense and sales accounts. *(List Price: $1,995 to $3,995, depending on customer requirements)*
Requires: 128K, two disk drives.
K.J.K. Systems
564 Columbian St.
Weymouth, MA 02190
(800) 323-5511
(617) 337-0234

CIRCLE 612 ON READER SERVICE CARD

Market Maestro

A technical analysis program for stock selection and timing that generates buy and sell signals on stocks or commodities. The program is based on an exponentially-weighted moving averages crossover algorithm. Price data may be entered manually or downloaded from CompuServe or Dow Jones News Retrieval using a modem. *Market Maestro* includes a 60-page user's manual. *(List Price: $125)*
Requires: 64K, one disk drive, MS-DOS, modem.
AJH Systems
3032 S. Saulsbury St.
Denver, CO 80277
(303) 985-9062

CIRCLE 658 ON READER SERVICE CARD

PLOT!

A graphics program which allows user to plot and process data and/or curves described by mathematical functions. The program allows switching back and forth between linear, semi-log and double log scales, and to calculate and plot inverse, power, and linear functions of the data points. A user can calculate slopes, add data stored on disk to new data and find and plot the least square fit of the data points. *PLOT!* also allows labels to be placed anywhere on the graph, and graphs may be directly sent to a printer by a single keystroke. *(List Price: $29.95)*
Requires: 64K, one disk drive, PC-DOS with BASICA, and a color/graphics adapter card.
Non-Linear Products
P.O. Box 14755
Minneapolis, MN 55414

CIRCLE 648 ON READER SERVICE CARD

New On The Market

ENERGRAPHICS

A two- and three-dimensional interactive color/B&W graphics program that was designed to perform business graphics and computer aided design functions for engineers and architects. The program can also perform flow charting for computer programmers, statistical plotting for scientific applications, and other drawing functions for the general user.

ENERGRAPHICS can construct 2-D line and pie charts and 3-D bar charts. A graphics editor can be used to output text and graphics in presentation or in document form. The technical user can use *ENERGRAPHICS* as a CAD system to construct 2-D or 3-D objects using data file inputs or advanced cursor drawing techniques. These objects can be saved and recalled for editing, rotating, zooming, hidden line removal, and text addition. Architects, electrical engineers, and computer programmers can also use the *ENERGRAPHICS* programs for developing a table of symbols or forms that can be recalled by a single keystroke and placed on the screen with any size variation, for use in architectural floor plan layouts or printed circuit diagramming. Three-dimensional surfaces and functions can also be plotted, viewed, and analyzed statistically. *(List Price: $250)*
Requires: 64K RAM, one disk drive, graphics adapter board.
Enertronics Research, Inc.
150 North Meramec, #207
St. Louis, MS 63105
(314) 725-5566

CIRCLE 601 ON READER SERVICE CARD

DATA DESIGN

A menu-driven relational database management system that features help screens, 26 simultaneous indexes (sort orders), multiple input/output forms, calculated fields with post option, internal backup, and phone communication system. *(List Price: $225)*
Requires: 128K, two disk drives.
Insoft, Inc.
10175 S.W. Barbur Blvd., #202B
Portland, OR 97219
(503) 244-4181

CIRCLE 600 ON READER SERVICE CARD

FIXED ASSET MANAGER

A financial management program that provides for two depreciation schedules per asset (book and tax), three standard depreciation methods and 20 user-defined methods. Assets may be classified by location or type. *(List Price: $150)*
Requires: 64K, PC-DOS, printer.
Softrend Inc.
P.O. Box 1462
Charlotteville, VA 22902
(804) 979-8194

CIRCLE 599 ON READER SERVICE CARD

The Financial Planner

A financial modeling and spreadsheet program that works as part of the Delta-DSS analytical work station. The work station incorporates graphics, word processing, communications, electronic news reporting, and large-scale data management. Designed for financial forecasters, the program is used for comprehensive planning and analytical projections, giving users tracking and control power over a number of business variables. Applications include profit/loss forecasts, cash flow management, cash requirements forecasting, new business ventures, capital investment analysis, product line planning, material and labor requirements, and marketing plans and performance. *(List Price: $700)*
Requires: 128K, PC-DOS.
Ashton-Tate
9929 West Jefferson Blvd.
Culver City, CA 90230
(213) 204-5570

CIRCLE 598 ON READER SERVICE CARD

The AUTHOR

An authoring system program designed to teach novices the creation of menu, query, and narrative instructional screens. A self-instructional course and documentation manual are included. *(List Price: $195)*
Requires: 64K, two disk drives, PC-DOS.
Phoenix Performance Systems, Inc.
324 South Main St., #1
Stillwater, MN 55082
(612) 430-2980

CIRCLE 597 ON READER SERVICE CARD



PCP, Pro/Pac, Inc.

PCP

A printer control program which allows users to print using five type sizes, seven line spacings, slashed or plain zeroes, elongated print, bold print and two sizes of proportional print by typing the number of the print option on the menu. Options may be combined, and instructions are given for embedding printer codes in software.

PCP is available for the IBM Dot Matrix Printer, the Epson MX80/100 Printers, and the Apple Dot Matrix Printer. *(List Price: $24.95)*
Requires: 64K, one disk drive, PC-DOS, specified printer.
PRO/PAC, Inc.
14925 Memorial Dr. #105
Houston, TX 77079
(713)496-1179

CIRCLE 596 ON READER SERVICE CARD

VISIBLE PIANO

A program that converts the PC into a playable musical instrument by means of a software package and a plastic keytop overlay which makes the keyboard look and feel like a standard piano keyboard. In operation, the user can both see and hear the notes as they are being played. This is accomplished by use of the keyboard, display screen, and built-in speaker. No additional hardware is needed.

This product can be used by both beginner and experienced musicians. Simply insert the delivery disk, type "BASIC PIANO," and the computer is transformed into a two-octave instrument with one octave on the upper two rows of keys and the other octave on the lower two rows. *Visible Piano* has a full 8-octave range which is selected by the eight function keys.

The manual includes an explanation to musical notation. A simplified songbook is included. Advanced features include a space bar which simulates the pedal on a piano, alteration keys, and an edit mode which allows anything on the page to be changed with full cursor control. The 200 note tune memory can be displayed one page at a time. The screen can be printed any time with the "PrtScr" key to produce a printed score. *(List Price: $45)*
Requires: 64K, one disk drive, PC-DOS, 80-column monitor.
Synthalytics
P.O. Box 54131
Westlake, OH 44145
(216) 892-1315

CIRCLE 595 ON READER SERVICE CARD

TaxCalc

A program to define and select the lowest tax alternative. Using *VisiCalc*, *SuperCalc*, *1-2-3* or *Multiplan* template, *TaxCalc* input lines follow Internal Revenue Service forms. Computations include capital gain deduction, capital loss limitation, contribution limitations and the two-earner married couple deduction.

The program can also calculate the income averaging tax, minimum tax, alternative minimum tax (including tax credit limitations) and selects lowest tax alternative. Using the *VisiCalc*, *SuperCalc*, *1-2-3* or *Multiplan* window on a monitor, the user can check results of tax variables and "what if" scenarios. The program provides for printing hard copies as permanent records. *(List Price: $125)*
Requires: 64K, one disk drive, PC-DOS.
TaxCalc
4210 W. Vickery
Fort Worth, TX 76107
(817) 738-3122

CIRCLE 594 ON READER SERVICE CARD

STAT-PAK

A menu-driven, file oriented statistical analysis program intended for use by biologists, ecologists and environmental scientists, as well as students of these disciplines. The program features on-screen instructions and examples of structures for each procedure.

Procedures include Data Transformation, Probablity Distributions, Goodness of Fit tests, Descriptive Statistics for grouped and ungrouped data, Correlation, Linear Regression (data plotting, and comparison of regression lines), Analysis of Variance (factorial and nested designs) and Analysis of Covariance. *(List Price: $95)*
Requires: 64K, PC-DOS
Science Software
RFD 2, Box 63
Nelsonville, OH 45764
(614) 753-1397

CIRCLE 593 ON READER SERVICE CARD

Spectra/MEDICAL

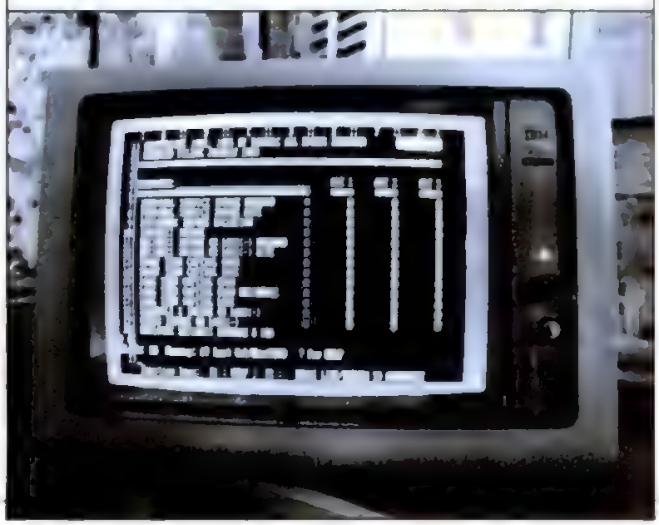
A menu-driven medical office management program for the PC-XT designed for practices that include up to 15 doctors. Features include accounts receivable control with open item or balance forward capabilities, variable period aging reports, delinquency notices, daily cash reports, journal and day sheets.

A patient account can be entered in a family group account or as an individual account, and can be accessed by name or account number. Histories can be stored for later access by user-defined search fields.

Practice management features include daily and period-to-date reporting of services performed, by doctor and/or practice and period-to-date diagnosis analysis. The program also includes a recall appointment schedule with report, mailing notices and labels. *(List Price: $2,495)*
Requires: 128K, color or monochrome monitor.
Spectra/Soft, Inc.
P.O. Box 277
Chandler, AZ 85224
(602) 963-6380

CIRCLE 592 ON READER SERVICE CARD

TAXCALC, Taxcalc.



New On The Market

TK!Solver

An interactive program to solve engineering and business problems without additional programming. A problem is formulated as a *TK!Solver* model and expressed as a set of equations defining the relationship between variables. The user enters the model in the *TK!Solver* program, enters all known variables, and types in the Action command (!). The program then solves for all unknown variables.

TK!Solver also features application subroutines that solve numeric problems in a specific field, such as financial management, mechanical engineering, electrical engineering, building design and construction, high school science, and units of measurement. *(List Price: $299; subroutine packs, $100 each)*

Requires: 96K, one disk drive, PC-DOS.

Software Arts
27 Mica Ln.
Wellesley, MA 02181
(617) 237-4000

CIRCLE 667 ON READER SERVICE CARD

Fixed-Income Securities Calculations

A financial investment program that calculates yield, price, and related figures for the major classifications of such investment instruments as municipal bonds, U.S. Treasury and Federal Agency notes, corporate bonds, and certificates of deposit. It handles periodic, interest-at-maturity, and discounted securities, and provides fully-invested and interest computations. The program's formulae adhere to the accepted conventions and procedures of the securities industry. *(List Price: $185)*

Requires: 64K, one disk drive, PC-DOS.

Momentum Software
533 Sutter St., #1025
San Francisco, CA 94102
(415) 982-7375

CIRCLE 611 ON READER SERVICE CARD

COMMERCIAL CREDIT ANALYSIS

A menu-driven program that generates reports analyzing the financial condition of a given company. The user keys company data into an input format based on the type of industry to be analyzed. The program then generates reports from the input form, including historical financial statements, financial ratios, historical cash flow reports, and graphs. *(List Price: $3,000)*

Requires: 256K, PC-DOS, Lotus 1-2-3, monitor, printer.

Baker Hill and Co.
P.O. Box 4065
Englewood, CO 80155
(303) 628-9609

CIRCLE 662 ON READER SERVICE CARD

TK! Solver, Software Arts



Space Miner

A game that involves the player in a deep-space mining operation. The player must collect chunks of ore using a robot arm, while periodically defending himself against attack from alien craft. Fuel and missile supplies are limited, and player must replenish by snaring fuel and/or missile modules. If player's ship remains intact long enough, a "mothership" comes to the rescue.

Space Miner features permanent tracking of the top ten players, optional help screens, a sound on/off key, a background music score that includes Bach, a pause control key, a "panic" escape key, and fuel and missile gauge displays. *(List Price: $29.95)*

Requires: 64K, one disk drive, PC-DOS, color/graphics adapter card, color monitor.

Resolution Software
B Edgewood Blvd.
Providence, RI 02905
(401) 461-2417

CIRCLE 605 ON READER SERVICE CARD

Plus Software

A property and casualty insurance agency accounting program. *Plus Software* features invoicing functions, and produces automatic daily and monthly reports including balance sheet, income and expense, accounts payable/current, accounts receivable, cash receipts, and cash disbursed. *(List Price: $2,500)*

Requires: 128K, two 320K floppy disks, PC-DOS, 132-column printer.

Dimensional Business Systems, Inc.
250 N.W. 4th Diagonal
Boca Raton, FL 33432
(305) 368-0270

CIRCLE 665 ON READER SERVICE CARD

Teach Yourself VisiCalc

A PC computer-based course designed to familiarize users with the basic features of *VisiCalc* worksheets and help them create actual budget worksheets. Users learn how to enter labels and values on the worksheet and how to use the Backspace and Break keys to make entry corrections. They progress through a series of six lessons, consisting of interactive learning sessions and practice exercises on the training disk, and practice problems in the *Teach Yourself Handbook*. *(List Price: $65 to $100 per course)*

Requires: 64K, PC-DOS, one disk drive, 80-column display.

DELTAK Microsystems
1751 West Diehl Rd.
Naperville, IL 60566
(800) 282-5586

CIRCLE 635 ON READER SERVICE CARD

PCLAB and PCTHERM

Two programs for use with Data Translation's DT2801 and DT2805 analog/digital I/O boards. *PCLAB* and *PCTHERM* are libraries of routines designed to be called from BASIC programs operating under PC DOS. They are intended for use in scientific research, laboratory measurement, industrial automation, and quality control testing.

PCLAB supports all analog and digital I/O and clock functions of the DT2801 board. *PCTHERM*, a superset of *PCLAB*, includes pre-programmed thermocouple tables to linearize any type of thermocouple input when used with the DT2805. *(List Price: PCLAB $495; PCTHERM $695)*

Requires: *PCLAB:* 64K, one disk drive, PC DOS, BASIC, DT2801 board; *PCTHERM:* 64K, one disk drive, PC-DOS, BASIC, DT2805 board.

Data Translation, Inc.
100 Locke Dr.
Marlboro, MA 01752
(617) 481-3700

CIRCLE 668 ON READER SERVICE CARD



PCLAB routines library, Data Translation

UAP-LINK

A program that permits transfers of binary or text files between PC-compatible microcomputers and IBM mainframes with TSO.

Working through standard RS-232 asynchronous ports, a full protocol corrects line errors, data compression increases throughout, and no conversion programs are required to reformat text data.

Additional features include single user control, an intelligent terminal mode, file protection, command files, operator cancellation, and remote message display. Terminal mode support includes Half/Full duplex, parity format, programmable baud rates, XON/XOFF, and diagnostic commands. *(List Price: $250)*

Requires: 64K, one disk drive, PC-DOS, serial port.

Unique Automation Products
15401 Redhill Ave., #G
Tustin, CA 92680
(714) 730-1012

CIRCLE 636 ON READER SERVICE CARD

New On The Market

ScratchPad with VoiceDrive

A financial spreadsheet program with voice recognition software interface. *ScratchPad with VoiceDrive* allows user to operate the program by talking into a microphone. This includes commands for subroutine operations and data entry and retrieval.

The program also allows simultaneous use of keyboard, in which user may, for example, format a basic spreadsheet, then perform "what if" analyses vocally. Vocal instructions are given in plain English, and are translated automatically into the binary codes the application program can utilize. *(List Price: $495)*

Requires: 128K, PC-DOS, Tecmar Voice Recognition Board.

SuperSoft
1713 S. Neil St., P.O. Box 1628
Champaign, IL 61820
(217) 359-2112
Telex: 27 0365

CIRCLE 649 ON READER SERVICE CARD

Family Reunion

A genealogical records management program. The program is divided into three modules: *Family Group*, *Family Tree*, and *Family Reunion*. The modules allow the user to store and organize detailed information about family members and family relationships for up to six generations. *(List Price: $99.95)*

Requires: 64K, two disk drives, 80-column display, PC-DOS, printer.

Personal Software Co.
P.O. Box 776
Salt Lake City, UT 84110
(801) 277-3174

CIRCLE 638 ON READER SERVICE CARD

CATalog Disk Librarian

A menu-driven disk management program that can support 75 disk directories on a 160K disk drive. Each directory can contain up to 198 files. Each file has a 40-character comment field, its date of creation, number of bytes, as well as code for the description of the volume of which the file is a part.

Directories are divided into 25 volumes, each of which is labelled with a 38-character description. *CATalog* can format and print lists or display them onscreen. *(List Price: $34.95)*

Requires: 64K, one disk drive, PC-DOS, 80-column monitor.

Multipro
369 Lexington Dr.
Saline, MI 48176
(313) 429-2344

CIRCLE 640 ON READER SERVICE CARD

FormManager

An integrated software package combining data management, forms processing, and data processing. The program allows a user to retrieve records sequentially or randomly by value. *FormManager* utilities include *FormEditor*, a tool for screen formatting, math computation capabilities, and a Print capacity. *(List Price: $149; demonstration disk only, $15)*

Requires: 128K, 2 double-sided disk drives, PC-DOS 1.1, 80-column display, printer.

BIT Software Inc.
1048 Nicklaus Ave.
Milpitas, CA 95035
(408) 262-1054

CIRCLE 639 ON READER SERVICE CARD

ScratchPad with VoiceDrive, SuperSoft



ReadiTerm

A communications program allowing the user to communicate, at baud rates from 100 to 9600 in full- or half-duplex modes, with other computers or network systems such as the Source or the Dow Jones News/Retrieval Service.

ReadiTerm can automatically call remote systems, issue predefined commands, capture the resulting output, and disconnect for offline viewing. User can also access network systems directly. Command files allow automatic dialing and login to any system facility with a single keystroke. Function keys are user-definable, and keys may be assigned a *ReadiTerm* command or a text string. The program also allows received data to be saved on disk and/or to be routed to a printer. *(List Price: $75)*

Requires: 64K, one 160K disk drive, PC-DOS, modem.

ReadiWare Systems, Inc.
P.O. Box 680
West Redding, CT 06896
(203) 431-3521

CIRCLE 642 ON READER SERVICE CARD



SCHED:PLANNER, Key-1 Computer Systems

File Transfer Program

A program allowing transfer of files from an Apple II, IIe, or II+ to the PC. Included with the software is an adapter that allows the two systems to connect, as well as communications programs for both systems.

The program permits the transfer of binary, random, text, or data files, high level language programs, spreadsheet software data, etc. File concatenation is provided, as well as the ability to send files of any length at supported rates of 110 to 9600 baud. *(List Price: $24.95)*

Requires: RS-232 board, one disk drive in each system.

Personal Computer Products
1400 Coleman Ave., Ste. C-18
Santa Clara, CA 95050
(408) 988-0164

CIRCLE 606 ON READER SERVICE CARD

SCHED:PLANNER

A menu-driven program that organizes individual employee schedules into master and submaster weekly schedules, composes and prints out a variety of schedule formats, and calculates the various labor costs for each schedule.

SCHED:PLANNER uses graphic data entry and can handle up to 1,800 weekly employee schedules on a single disk. The disk is organized into nine weekly schedules for a maximum of 200 employees each. Each employee may be scheduled for up to two shifts per day, 24 hours a day, seven days a week.

The user can specify up to 40 different job titles and work assignments. *SCHED:PLANNER* incorporates these categories in cost analyses, permitting the scheduler to break down the cost of each schedule by day, employee, title, or assignment.

The program can also calculate and report the costs for a given schedule using each employee's hourly rate, applying break and overtime policies in the calculation. Reports show the daily cost of each employee, the cost of each job title category, the cost of each work assignment category, and the total costs. The employee's copy of the schedule can include regular and overtime pay for each shift.

SCHED:PLANNER features a Consolidated Schedule, a weekly master schedule that combines the schedules of all employees, groups them according to assignment, and displays them as time-line graphs. Each day is covered on a separate schedule. *(List Price: $750; documentation, $30)*

Requires: 64K, two 320K disk drives, printer.

KEY-1 Computer Systems
178 Spring St.
Newport, RI 02840
(401) 849-4053

CIRCLE 659 ON READER SERVICE CARD

New On The Market

MedMan

A CP/M-based data management program for medical practices. The program can maintain records for up to 4000 patients, with services and charges attributable to each doctor in a multi-physician practice.

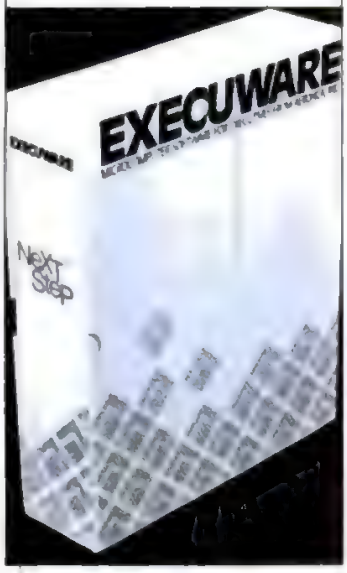
MedMan also features a referral file of medical specialists with the number of referrals, charges and receipts each specialist has generated. The program can also prepare insurance forms, including Blue Shield and the Standard AMA Health Insurance Claim Form, as well as generate recall notices, statements, and a variety of reports. *(List Price: $3,995)*

Requires: 64K, two disk drives, CP/M-80, Baby Blue card.

Prodigy Computer Systems
497 Lincoln Hwy.
Iselin, NJ 08830
(201) 283-2000

CIRCLE 651 ON READER SERVICE CARD

Next Step, Execuware.



Next Step

A programming utility that allows users to create a customized data collection/retrieval system with minimal use of database syntax or complex programming languages. User's programs are automatically written in Microsoft BASIC.

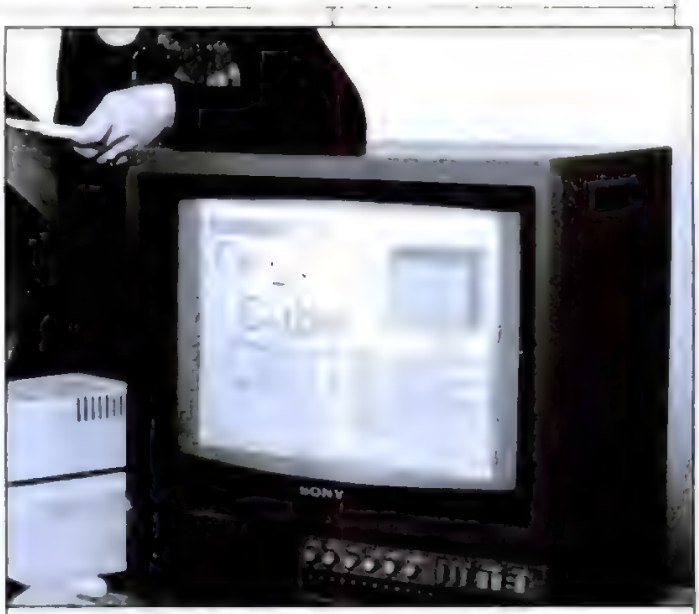
Next Step features its own database management system, and an "electronic programmer" to retrieve and process data to create any type of report. The user defines the data fields to be stored by creating up to 15 "key" fields by which the program is to search the database for data needed. When querying the database, any combination of key fields provide the search avenues. As the system is designed by the user at each step in the process, reports can be structured in any needed sequence and format.

The database features user-defined automatic editing criteria, customized screen and report formatting, and user-written menus. Reports can be printed including all or any part of records in the file, including records selected by key, partial key, or range of keys. *(List Price: $295)*

Requires: 128K, two disk drives or hard disk, PC-DOS 1.1. or 2.0, 80 × 25 monitor, printer.

Execuware
Intercontinental Plz., #300
P.O. Box 10
7415 Pineville-Matthews Rd.
Charlotte, NC 28211
(704) 541-1199

CIRCLE 609 ON READER SERVICE CARD



Crypto-Cube, DesignWare, Inc.

Crypto-Cube

A word puzzle game for ages six to adult, good at building vocabulary skills in children. *Crypto-Cube* features a cube that rotates, each side exposing a grid similar to a crossword puzzle. Players take turns uncovering letters to fill in the missing words. The *Crypto Disk* contains 50 possible games, and players can also create their own word lists and generate new games. *(List Price: $39.95)*

Requires: 48K, one disk drive, PC-DOS.

DesignWare, Inc.
185 Berry St., Bldg. 3, #158
San Francisco, CA 94107
(415) 546-1866

CIRCLE 663 ON READER SERVICE CARD

FTX

A full screen editor for use with any text file. Keyboard support includes cursor control, home key, line tabbing, insert, delete, overtype characters, and erase line.

Data manipulating commands include ADD, COPY, DELETE, MOVE, REPEAT (duplicate), STACK (accumulate), and INSERT. Control functions include CHANGE (performs global changes to file), FORWARD or BACKWARD from 1 to 99 lines or pages, TOP, BOTTOM, LOCATE, and PRINT. Lines can be extended up to 152 positions. *(List Price: $65)*

Requires: 64K, one disk drive, PC-DOS, monochrome display, 80 cps matrix printer.

Probity
P.O. Box 259
New Lenox, IL 60451
(815) 485-3493

CIRCLE 641 ON READER SERVICE CARD

Computer Running Log

A log program for runners that allows the user to analyze his workouts and running history. Daily running information recorded includes up to two workouts per day, races, and interval workouts. Each workout asks for distance, time, location, and comments. Average pace is computed for each run.

The analysis portion of the program computes year-to-date mileage, monthly total miles, and weekly miles and average pace. It also allows for listing selected daily run data, races, and interval workouts between any two dates in the log, for analysis of performance progress in the time lapsed or comparison of performance at different periods. Also applicable to bikers, skiers, swimmers, etc. *(List Price: $42.95)*

Requires: 48K, one disk drive, 80-column printer.

Homesoft, Inc.
Dept. A, P.O. Box 6254
Salt Lake City, UT 84106
(801) 487-1918

CIRCLE 610 ON READER SERVICE CARD

Diskette Manager

A library program for disk management, with printing capability. Disk labels can be printed containing disk name, file names, up to eight lines of comments, and the storage status of each disk. A catalog file is automatically constructed with the label information plus file size and storage dates, which is updated as new disks are labelled. One catalog disk can contain 6,000 file or comment entries regarding 200 disks.

By utilizing the graphics capabilities of the IBM or Epson printers, 64 file names can be printed on one standard 4-inch × 1⅞-inch label. If more than 64 files reside on a disk or the number of comments exceeds the space available, a second label is generated. *(List Price: $50)*

Requires: 64K, two disk drives, 80 character display, dot matrix printer.

Lassen Software, Inc.
P.O. Box 1190
Chico, CA 95927
(916) 891-6957

CIRCLE 643 ON READER SERVICE CARD

Report Manager, Datamension Corp.



Archives V

A pair of utility programs allowing transfers of data to and from cassette, through the PC's cassette interface. *Archives V* is capable of transferring any files regardless of type, and permits a user to back up or permanently store files using a cassette recorder. *(List Price: $39.95)*

Requires: 64K (specify memory when ordering), one disk drive, PC-DOS 1.0 or 1.1.

Indiana Digital Corp.
P.O. Box 3755
South Bend, IN 46619
(219) 288-7280

CIRCLE 608 ON READER SERVICE CARD

Report Manager

A three-dimensional spreadsheet program with over 50 preformatted reports. *Report Manager* allows users to view spreadsheet data by specified pages, rows or columns, and includes a help facility containing 35 context-sensitive screens that list options and summarize commands.

The *Report Manager* training package includes a 154-page manual, a data disk containing interactive examples tied to the manual, a wall-sized chart showing program commands, and a pocket-sized reference card with a summary of commands, functions, and formulas. *(List Price: $399)*

Requires: 128K, two floppy disk drives or single hard drive, PC-DOS.

Datamension Corp.
615 Academy Dr.
Northbrook, IL 60062
(312) 564-5060

CIRCLE 650 ON READER SERVICE CARD

New On The Market

Weather Analyst

A weather data management program which stores and analyzes user's observations. The program contains an historical database of weather data going back to 1951, which is updated as user enters daily temperatures and precipitation amounts. Routines available through the program's menu can produce tables and graphs showing accumulated amounts, averages, departures from norm, extremes, and degree days.

Displays can be printed on any IBM/Epson printer equipped with Graftrax. *(List Price: $89.95)*

Requires: 128K, one disk drive, color/graphics card.

Climate Assessment Technology, Inc.
11550 Fuqua, #355
Houston, TX 77034
(713) 484-3603

CIRCLE 607 ON READER SERVICE CARD

File Clerk * Reporter

An application generator and file management program. Six types of programs can be created: file maintenance, report, label print, menu, file update (skeleton), and file conversion. *File Clerk * Reporter* also features binary tree indexing and dynamic record allocation. A tutorial is included to familiarize the user with each feature. *(List Price: $200)*

Requires: 64K, one or more disk drives, MS-DOS, BASIC.

Landrum Software
531 Greenleaf
Richardson, TX 75080

CIRCLE 666 ON READER SERVICE CARD

ACCESSORIES

Power Grip Joystick

An ergonomically-designed joystick, featuring a commercial size molded handgrip. The Power Grip Joystick also features two fire buttons, one at the base and one on the top of the hand grip, activated by a two-position slide switch. Unit includes a 5-foot cord. *(List Price: $36.95)*

Requires: Interface card, model 50-2070.

Wico Corp.
6400 Gross Point Rd.
Niles, IL 60648
(800) 323-4014
(312) 647-7500
Telex: 38-9413

CIRCLE 624 ON READER SERVICE CARD

Power Grip Joystick, Wico Corp.



Trackball

A phenolic ball control unit, the Trackball features two independent fire buttons, sealed steel bearing and spring suspension construction. It provides variable speed, 360-degree control of objects on-screen. *(List Price: $79.95)*

Requires: Interface card, model 50-2070.

Wico Corp.
6400 W. Gross Point Rd.
Niles, Il 60648
(800) 323-4014
(312) 647-7500
Telex: 28 9413

CIRCLE 625 ON READER SERVICE CARD



Dust-Off II and Stat-Off II, Falcon Safety Products.

Dust-Off II and Stat-Off II

A computer cleaning and maintenance kit containing a Dust-Off II canister of moisture-free propellent, a Mini-Vac, and Dual Extender accessories. The canister features a locking valve capable of continuous filtered blasts or short controlled bursts to blow dust away from surfaces. When attached to the canister, the Mini-Vac acts as a vacuum cleaner to pick up dust, lint and dirt particles, depositing them into a trap. The Dual Extender consists of a long, thin extension to reach into tight areas, and a two-foot hose.

A separate accessory, the Stat-Off II Adapter, fits over the canister's nozzle to produce an ionized dry blast. It can be used over keyboards to eliminate static prior to use. *(List Price: Kit $42.50)*

Falcon Safety Products
Department V
1065 Bristol Rd.
Mountainside, NJ 07092
(201) 233-5000

CIRCLE 603 ON READER SERVICE CARD

Synergetix Work Station

A multi-function, mobile work station with a swing-out cabinet. The main section of the Work Station provides space for a PC's CPU, keyboard and display unit. The swing-out section accommodates a printer and supplies. For security, the Work Station can be closed and locked, and provides for internal wiring of all components.

The unit measures 34½ inches high, 26¼ inches deep and 28 inches wide (55¼ inches when fully opened). It is mounted on casters, allowing it to be moved by one person, and is available in white, teak, and charcoal finishes. *(List Price: $850)*

IBM Systems Supplies Div.
P.O. Box 10
Princeton, NJ 08540
(201) 329-7000

CIRCLE 626 ON READER SERVICE CARD



Synergetix Work Station, IBM Corp.

Extension Packages

A package for the IBM PC equipped with monochrome display, and one for the IBM color display. Both packages include a 6-foot coiled keyboard cable, a 4-foot power cord, and a 4-foot video display cable. *(List Price: $59 per package)*

Computer Accessories Corp.
7696 Formula Pl.
San Diego, CA 92121
(619) 695-3773

CIRCLE 627 ON READER SERVICE CARD

THE CIRCUIT JUDGE

A plug-in surge protection device that monitors AC line voltage for surges of 300 volts or more, continuous high voltage of 125 volts or more, continuous low voltage of 100 volts or less, or sudden power loss. Disturbances are indicated on an L.E.D. display, and an incorporated clock records the time of last disturbance until reset. *(List Price: $129.95)*

Digitronics Marketing Div.
Comtec Information Systems, Inc.
53 John St.
Cumberland, RI 02864
(401) 724-8500
TWX: 710-387-1171

CIRCLE 623 ON READER SERVICE CARD

KEYTOPS

A set of four enlarged keys that slip over the Return, Tab, and Shift keys. They clearly increase key size and visibility, to ease key use. KEYTOPS are dark brown in color and are made of the same nonglare material as the original keys. *(List Price: $18.95)*

APPLIED DYNAMICS
P.O. Box 1810
Dept. PN
Cottonwood, AZ 86326
(602) 634-7148

CIRCLE 628 ON READER SERVICE CARD

New On The Market

PUBLICATIONS

Microcomputers: A Checklist of Security and Recovery Considerations

A guide to covering security, backup, documentation, maintenance, and contingency planning for programs written for microcomputers. The book provides a set of critical questions for users to consider in establishing a protection program. *(List Price: $1.00)*
Assets Protection Publishing
5201 Old Middleton Rd.
Madison, WI 53705
(608) 231-3817

CIRCLE 634 ON READER SERVICE CARD

Planning the Electronic Office

A guide to the designing of offices incorporating computer technology. This book by Elaine and Aaron Cohen focuses on the functional, economic, psychological, and physical aspects of office environments.

Planning the Electronic Office details how to identify, examine, and coordinate the factors necessary for design integration of an office. It describes planning for an office to gradually become more electronic over a period of years, methods for adapting to increasing storage needs, and techniques for maintaining control of noise and heat. *(List Price: $27.50, 241 pgs.)*
McGraw-Hill Book Co.
Professional & Gen'l Books
1221 Avenue of the Americas
New York, NY 10020
(212) 997-3493

CIRCLE 633 ON READER SERVICE CARD

Programming Documentation Guide

A four-volume reference set of programming methods and guidelines for establishing a company's internal programming and documentation practices. Three of the volumes cover standard methods for programming in Cobol, Fortran, and BASIC. The fourth volume covers software documentation practices. *(List Price: $45 per set)*
ATC Books
Rt. 2 Box 448
Estill Springs, TN 37330
(205) 837-4718

CIRCLE 602 ON READER SERVICE CARD

Coding Standard for BASIC

A coding guide for programming in BASIC. The 42-page book provides a set of company standards and examples of its applications.

As an aid to programmers, the guide provides a method to ensure the construction of top-down programs that are structured, testable, and maintainable. *(List Price: $22)*
Associated Technology
R. 2 Box 448
Estill Springs, TN 37330
(205) 837-4718

CIRCLE 601 ON READER SERVICE CARD

Alphanumeric Displays

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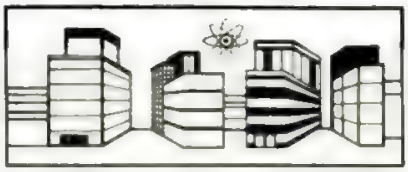


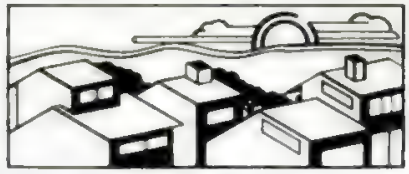
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CLUB NEWS/EDITED BY SUSAN HURLEY

Clubs, bulletin boards, and newsletters enable PC users to capitalize on their fellow users' knowledge.

PC User Groups

This list provides the names and addresses of PC User Groups worldwide. You can check this list to locate other PC aficionados in your area.

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Birmingham User Group
Chet Ellis
ComputerLand
215 W. Valley Ave.
Birmingham, AL 35209
(205) 942-8085

The Greater Gulf Coast Users Group
Jim McGinnis
124 Meadow Wood Loop
Daphne, AL 36526
(205) 626-9558

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c/o General Computer Services
213 W. Sixth Ave., #11
Anchorage, AK 99501

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Phoenix, AZ 80564
(602) 954-7519

IBM PC Idea Exchange
Lisa May
United Systems Corporation
1074 E. Sandpiper Dr.
Tempe, AZ 84283
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IBM PC User Group
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(602) 622-4751

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Sacramento, CA 95825

IBM PC Users Group of
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Ray Smyer
575 Ferndale Dr.
Santa Maria, CA 93455
(805) 937-7490

San Diego IBM User Group
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Carlsbad, CA 92008
(714) 434-1608

Stanford/Palo Alto User Group
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Stanford, CA 94305
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San Diego Computer Society
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1384 Caliente Loop
Chula Vista, CA 92010
(714) 421-9686

IBM PC User Group
Lee Wersel
7255 Orchard Dr.
Gilroy, CA 95020

Beach Cities IBM PC Users Group
Phil Root
6242 Moonfield Dr.
Huntington Beach, CA 92648
(714) 847-6369

PC will publish a periodic listing of PC user groups and their activities. Drop a line to Club News, PC, One Park Ave., New York, NY 10016. New groups and address changes are shown in boldface.

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Modesto, CA 95353
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(209) 578-2358

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Los Angeles, CA 90028
(213) 937-1314

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1533 Sherwood Village Circle
Placentia, CA 92670
(714) 996-4464

Diablo Valley PC
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Rancho Santa Fe, CA 92067

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San Francisco, CA 94118
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U.C. San Francisco User Group
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UCSF U-76
San Francisco, CA 94143
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PC Club
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San Francisco, CA 94109
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Montclair, CA 91763
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Bay Area User Group
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Santa Barbara City College Computer
Science Department
Stu Swartz
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Santa Barbara, CA 93109
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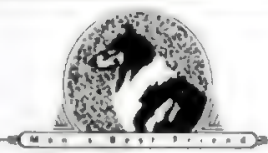
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Idaho PC User Group
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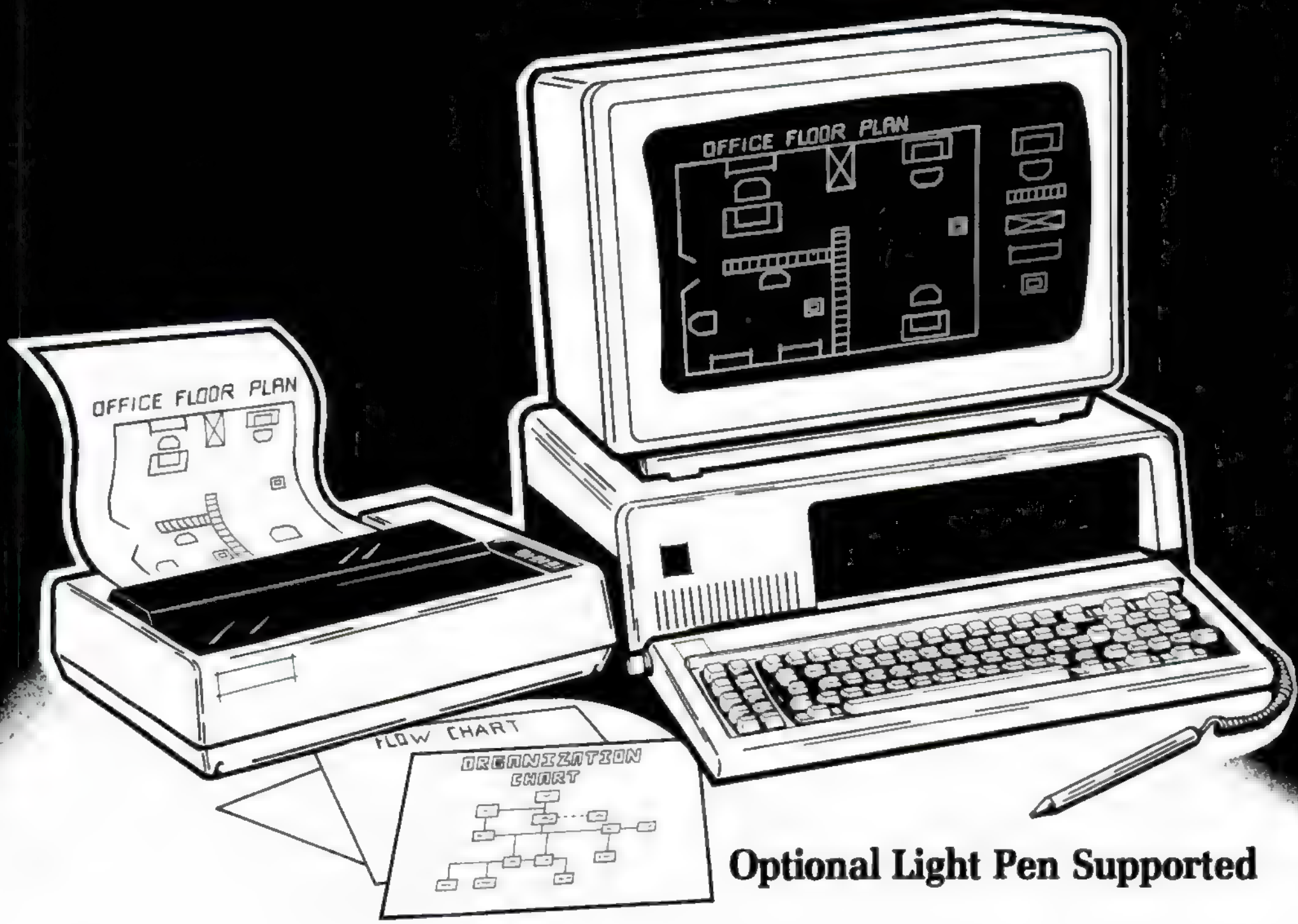
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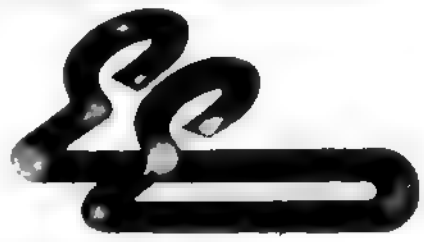
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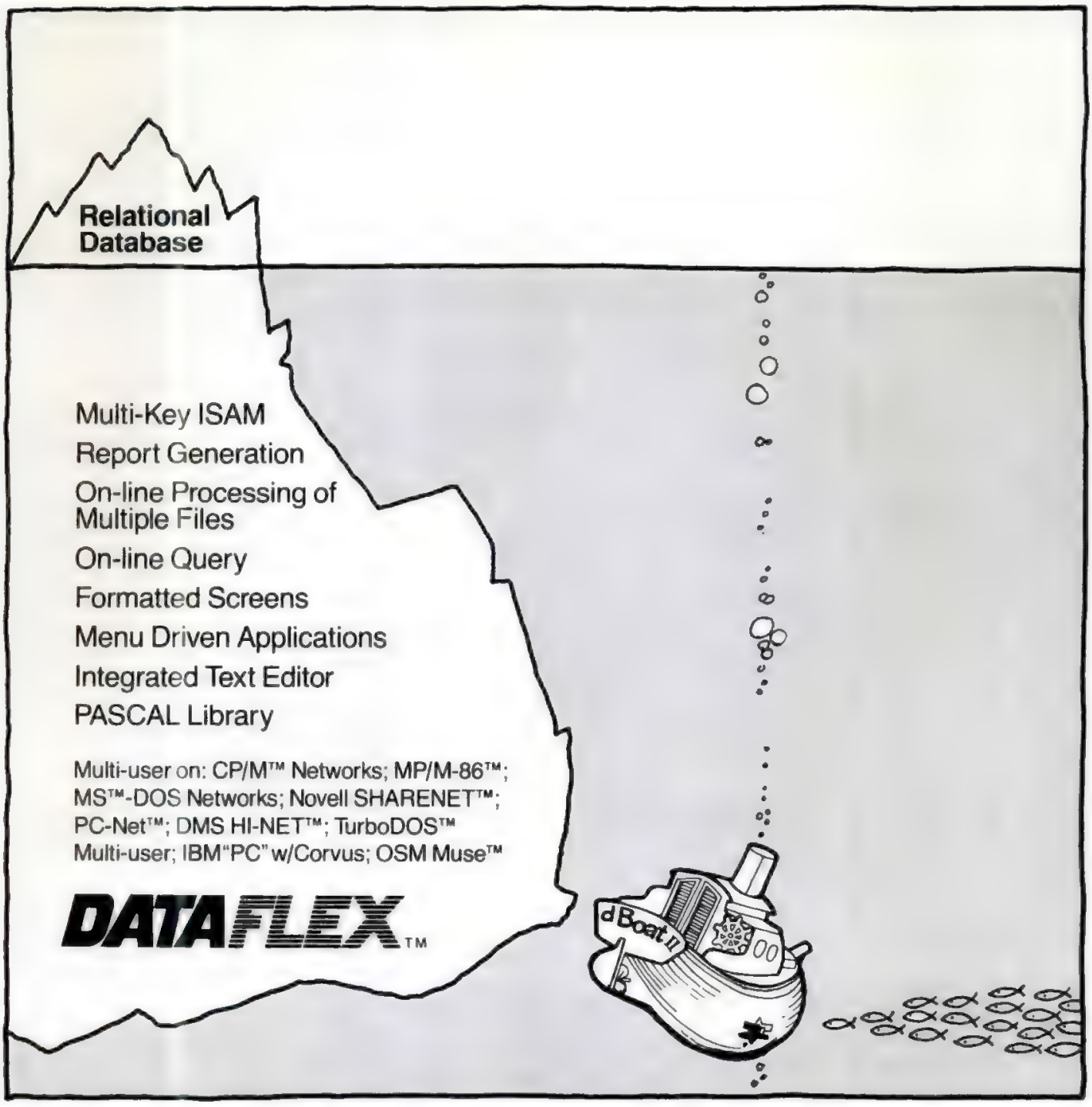
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To work on the examples in this chapter, we need to start with a clear screen. Enter and run the following:

```
120 SCREEN 1 REM MEDIUM RESO-
LUTION
130 KEY OFF
140 CLS
```

We'll also need some of the "pause & title" subroutines that were used in the last chapter.

```
5000 REM SUBROUTINE - PAUSE &
TITLE PAGE
5010 REM
5020  LOCATE 25,1
5030  INPUT "Press ENTER to
  continue";A
5040  CLS
5050  GOSUB  5080:REM  CEN-
TERED
TITLE
5060  RETURN
5070 REM
5080 REM  SUBROUTINE  -  CEN-
TERED TITLE
5090 REM
5100 LOCATE 1,(40-LEN(T$))
     /2+1
5110  PRINT T$;
5120 REM
5130  RETURN
5140 REM
```

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The Draw Command

Only one BASIC graphics command will be studied in this chapter, namely, the Draw command. This command has only one parameter. However, you can use the Draw command to generate all sorts of shapes because it can hold a whole series of special one-letter draw commands from a special command language called Graphics Definition Language (GDL).

More precisely, the syntax for the Draw command is:

```
DRAW string
```

where string is a string expression, consisting of drawing commands in the IBM PC BASIC GDL.

Now let's begin our examination of this language. We will start with a summary list of its various components, and then we will discuss the rules for putting these components together to form command strings. GDL consists of the following components:

Three special symbols:
- , comma
- = equal sign
- ; end of command

Constants and variables:
- any numeric constant
- any numeric variable
- any string variable

One global move command:
- M move

Eight local move commands:
- U move up
- D move down
- L move left
- R move right
- E move diagonally up and right
- F move diagonally down and right
- G move diagonally down and left
- H move diagonally up and left

Two modifier commands:
- B move but do not plot
- N move but do not change the current position

Three attribute setting commands:
- A set angle
- C set color
- S set scale

One command control command:
- X execute substring

Now let's begin a detailed discussion of the syntax rules for this language. The global move command M has two different modes: relative and absolute. These modes correspond, and indeed, perform in much the same way as the relative and absolute modes for the Point, Line, and Circle commands that we discussed last month. That is, in absolute mode, the new coordinates become the new current position and in relative mode, the new coordinates are added to the current position.

WHILE AN interrupt subroutine is executing, the corresponding interrupt key is stopped automatically.

The syntax used in this chapter, however, is quite different from that used in the last. Instead of using the key word Step to indicate relative mode as we did in the last chapter, we will use a strategically placed plus (+) or minus (−) sign. To see how this works, look at the syntax for the M command in absolute mode. Absolute mode is indicated by the letter M followed by an unsigned integer, a comma, and another unsigned integer. The first unsigned integer is the new x coordinate and the second unsigned integer is the new y coordinate. For example,

```
Mx,y where x and y are unsigned integers
```

The effect of this command is to draw a line from the old current position to the new current position given by the x and y coordinates.

Relative mode is indicated by a plus or a minus sign between the M and the first number (x coordinate), thus making it a signed integer. The second number (y coordinate) must also be a signed integer, but it does not have to display a plus sign if it is positive. The form is:

```
Mx,y where x and y are signed integers and x has an explicit plus or minus sign.
```

In the first example, the absolute form is used to draw a large arrowhead on the screen. The graphics cursor begins at the center of the screen, moves straight up toward the top, down and to the right diagonally until it hits the center of the right side of the screen, down and to the left diagonally until it is in the center near the bottom, back up to the center of the screen, to the right until it reaches the center of the right side, and then to the left until it reaches the left side of the screen.

The following program can be used to draw a large arrow using GDL absolute move commands.

```
160 REM MOVES
170 REM
180    T$="MOVES"
190    GOSUB 5080 :REM title
200 REM
210 REM Uses absolute global
   moves
220 REM
230     DRAW "m160,20"
240     DRAW "m319,
   100m160,179"
250     DRAW "m160,
   100m319,100m0,100"
260 REM
```

The command string can consist of a single move command, or several such commands can be joined together in the same string. It is also possible to put in semicolons to separate Move commands and to put spaces anywhere throughout the command string. Since the effects of several Draw commands are cumulative, you do not have to pack all your Move commands into one command string. Thus, you can avoid writing Draw command programs that are impossible to read because of their density.

GDL commands can be written in either upper or lower case.

Notice that the letter M is written in lowercase; GDL commands can be written

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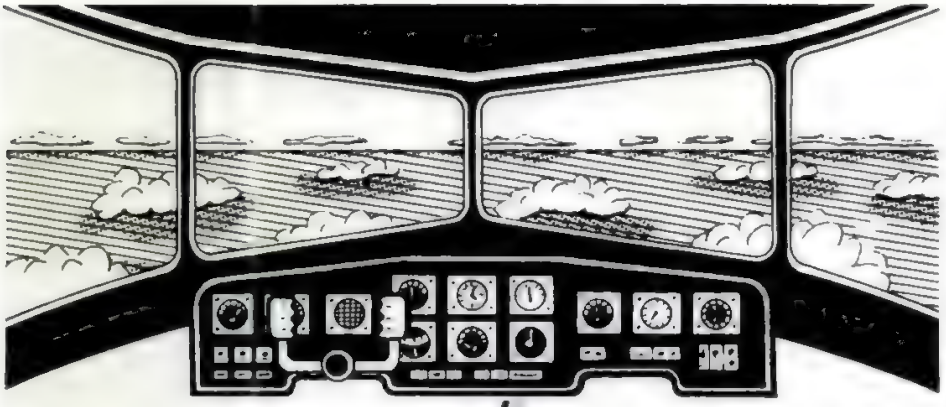
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in either upper- or lowercase. If you type in your BASIC program in lowercase, most of it will be transformed automatically to uppercase. This is not true for comments and strings, particularly GDL command strings; they will stay in lowercase.

The next example illustrates relative moves. The program shown below can be used to draw an eight-sided star. Again, the graphics cursor starts in the center of the screen. It then begins to draw, zigzagging from one side of the star to the other as it draws its points.

```
270 REM STAR
280 REM
290    T$="STAR"
300    GOSUB 5000 :REM title &
pause
310 REM
320 REM Uses relative global
moves
330 REM
340    DRAW "m+30,-75"
350    DRAW "m+75,+30"
360    DRAW "m+75,+30"
370    DRAW "m-30,-75"
380    DRAW "m-30,+75"
390    DRAW "m+75,-30"
400    DRAW "m-75,-30"
410    DRAW "m+30,+75"
420 REM
```

THE GRAPHICS cursor then begins to draw, zigzagging from one side of the star to the other.

Now for the local moves: U, D, L, R , E, F, G, H. The four major directions are indicated by the initials U for Up, D for Down, L for Left, and R for Right. Diagonal directions are also possible, using the letters E, F, G, H. These letters take you in a clockwise direction around the diagonal positions on a clock face, starting at 1:30 for E, 4:30 for F, 7:30 for G, and 10:30 for H.

In the next example, these local moves are arranged in clockwise order, starting with U at 12 o'clock noon (or midnight). The graphics cursor begins at the center

and turns around as it moves away from the center, forming a spiral. The spiral is square-shaped, but other effects are possible. The lines 520, 540, 560, and 580 can be replaced by lines that move by the amount i, followed by the amounts 1, 3, 5, or 7, respectively.

```
430 REM SPIRAL
440 REM
450   T$="SPIRAL"
460   GOSUB 5000 :REM pause &
  title
470 REM
480 REM Uses local moves
490 REM
500   FOR I=1 TO 150 STEP 8
510     DRAW "u=i;u0"
520     DRAW "e2"
530     DRAW "r=i;r2"
540     DRAW "f2"
550     DRAW "d=i;d4"
560     DRAW "g2"
570     DRAW "l=i;l6"
580     DRAW "h2"
590   NEXT I
600 REM
```

Global and Local Moves

There are three possible forms for the syntax for these local Move commands: the letter itself; the letter followed by an unsigned integer constant; and the letter followed by an equal sign, the name of a variable, and a semicolon. In the third case, you can even have indexed variables as long as the index is not an expression.

A letter by itself (first case) indicates a move by one unit (which equals one horizontal pixel length) in the indicated direction, while a letter followed by either an unsigned integer constant (second case) or by an "equals" variable (third case) allows you to move as many units as you specify in that direction. In the sample program shown above, we have mixed the second and third cases (constants and variables). We have even included a case in which the constant is zero. In subsequent examples, you will see instances of the first case (letter by itself).

THEN causes the current position to remain as it was before executing the command.

A Very Good Place to Start

The next two examples show how to use the B and N prefixes. These can be used with either the global or local Move commands we've discussed so far.

B stands for Begin. This command

Mimicking the CPU

We interrupt this program . . .

It is interesting to note that IBM BASIC mimics the interrupt facilities of its 8088 Central Processing Unit (CPU) (see Morgan and Waite, *8086/8088 16-bit Microprocessor Primer*, Byte Books). For the 8088 CPU, there is a whole section of memory that holds the locations of all the interrupt service routines. The programmer must load these locations to "declare" these routines. There are also processor instructions that can enable and disable interrupts. In contrast to interrupts in BASIC, these processor instructions disable or enable almost all interrupts at once (there are some that you cannot disable).

The interrupt service routines for the 8088 are in machine language, although they might be written in a higher level language such as PL/1. Each routine must end in a Return instruction, but in this case, the Return instruction is a slightly different kind of Return than the one used for ordinary subroutines for this processor. The difference is that more information is "saved" (and must eventually be restored upon return) when interrupt subroutines are executed.—M.W., C.L.M.

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causes the next command to be executed as a move without Draw, allowing you to place the unseen graphic cursor anywhere on the screen without scratching your beautiful drawing. Since the B command modifies only one Move command, you need to put it in front of each "unseen" move. The sample program below indicates how to use the B command to "pick up the video pen" to prevent the figures you are drawing from merging together. The program draws a set of small arrows shooting out over an arc.

```
610 REM ARROWS
620 REM
630    T$="ARROWS"
640    GOSUB 5000 ;REM pause &
title
650 REM
660 REM Uses B prefix
670 REM
680    DRAW "bm10,100;"
690 REM
700 FOR I=1 TO 24
710 DRAW "bu10bd=i;br10"
720 DRAW "r20d4e4h4d4120"
730 NEXT I
740 REM
```

Notice the initial global move in line 680. This puts the graphics cursor into the desired position to start the drawing. The FOR loop, lines 700-730, draws the entire picture. The command string "r20d4e4h 4d4120" is used to draw an arrow. The cursor is in the same place as it was when we started the arrow. It is generally a good idea to draw each subfigure so that the current position returns to its starting point. This is helpful when you want to use these subfigures in a complex drawing because you can work at a higher level, placing subfigures at various positions on the screen without worrying how the current position will be affected by the current subfigure.

In the current drawing, you will see that the arrows follow an arch. This is controlled by line 710 in which we move up by a constant amount, down by a variable amount, then over by a constant amount. This line represents the differences in position between the tails of the arrows. The differences are given by the linear formula:

```
i - 10
```

If the differences are linear, then the absolute positions are *quadratic*, and we will get a parabola that is the correct shape for a trajectory. This method is used in computer graphics to allow curves to be generated by fast linear processes. Generating curves in this way is called the method of *forward difference*.

The next example shows how to use the N prefix. This command causes the current position to remain as it was before executing the command. Since N affects only the very next Move command, it can not be used to return the current position to the starting point for a whole subfigure.

In this example, we have chosen to display a simple star or asterisk. The current position starts out at the center of the asterisk and remains there after drawing in each of the eight possible directions. We have chosen to draw the four major directions first (line 820), and then the diagonals (line 830), but you can name the lines in any order since the "pen" (current position) returns to the center each time.

```
750 REM ASTERISK
```

THE X command acts like a subroutine call in that it causes any command string that you name to be executed immediately.

YOU CAN name the lines in any order since the "pen" (current position) returns to the center each time.

```
760 REM
770   T$="ASTERISK
780    GOSUB 5000 :REM pause
and title
790 REM
800 REM Uses N prefix
810 REM
820 DRAW "nu30nr30nd30nl30"
830 DRAW "ne20nf20ng20nh20"
840 REM
```

Setting Colors and Drawing Figures

Our next example is somewhat longer than the previous examples in both the number of program lines and in the execution time, but it illustrates a number of different concepts. Much of the listing consists of comments. If you wish, you can skip some of these when you type it in.

The C command stands for Color, and it sets the color for all subsequent Move commands until the next C command. Its syntax is similar to that of the local Move commands, except that you cannot let the letter C stand alone without following it with a semicolon. When a semicolon follows C, a value of zero is assumed. Normally, C can be followed by an unsigned integer constant (case two) or by an equals sign, a variable name, and a semicolon.

The rules for associating numbers with colors are the same as in the previous chapter. In the medium resolution mode, you can use the numbers 0, 1, 2, 3 to specify four different colors, and in the high resolution mode, you can use the numbers 0 and 1 to specify the two on/off colors. The default is the foreground color, but it is not reset when you clear the screen. The color is, however, reset to this default value whenever you run the program.

THE ANGLE of rotation is 90 degrees times the number you specify in the A command.

The A command sets the angle for all subsequent Move commands until the next A command. Only four angles are allowed: 0, 90, 180, and 270 degrees. When you first turn on your computer and until you invoke the first A command, a value of 0 is used. The syntax for this command is the same as for the Color command. You must use the numbers 0, 1, 2, or 3, which correspond directly to the possible angles. In other words, the angle of rotation is 90 degrees times the number you specify in the A command. When objects are rotated by 90 or 270 degrees, they are drawn with the aspect ratio of 4/3. This means that rotated objects are drawn in such a way as to prevent them from looking distorted if you happen to be using an ideal TV monitor.

The last example in our series uses the X command. The X command acts like a subroutine call in that it causes any command string that you name to be executed immediately. In the command syntax, the letter X is followed by the name of a string variable followed by a semicolon. The semicolon must be present so that BASIC knows when the name of the string has ended. It is possible to have indexed string variables as long as the index is not an expression.

In the following example, an octagon is defined and stored in the string variable called FIG$. The FOR loop from lines 1660 to 1680 is in charge of drawing the various copies of the figure. This loop has only one Draw command through which the scale factor is set and the string FIG$ is executed. The X command is not really necessary since we could concatenate the strings s=A and FIG$ instead.

```
1530 REM POLYGON
1540 REM
1550 T$="POLYGONS"
1560 GOSUB 5000 :REM pause &
  title
1570 REM
1580 REM Uses the X command
1590 REM
1600 REM It shows a family of
octagons.
1610 REM
1620 FIG$="reuhlgdf"
1630 REM
1640 DRAW "bm120,180"
1650 REM
1660 FOR A = 8 TO 224 STEP 12
1670 DRAW "s=A;xFIG$;"
1680 NEXT A
```


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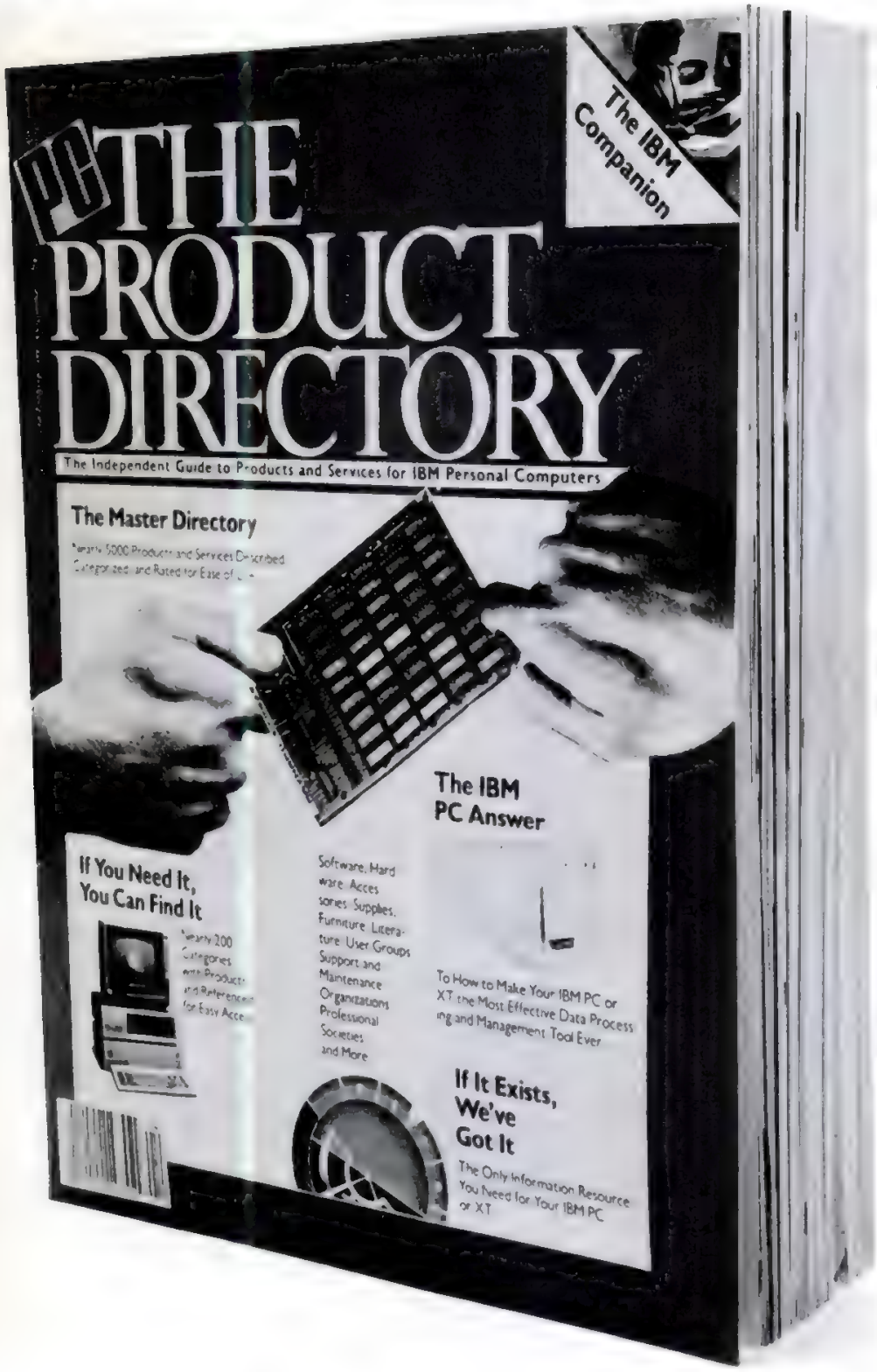
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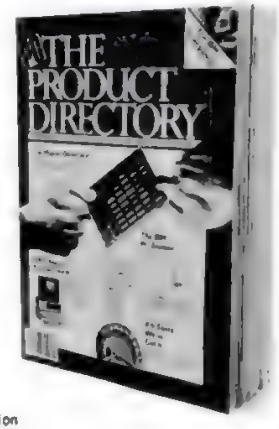
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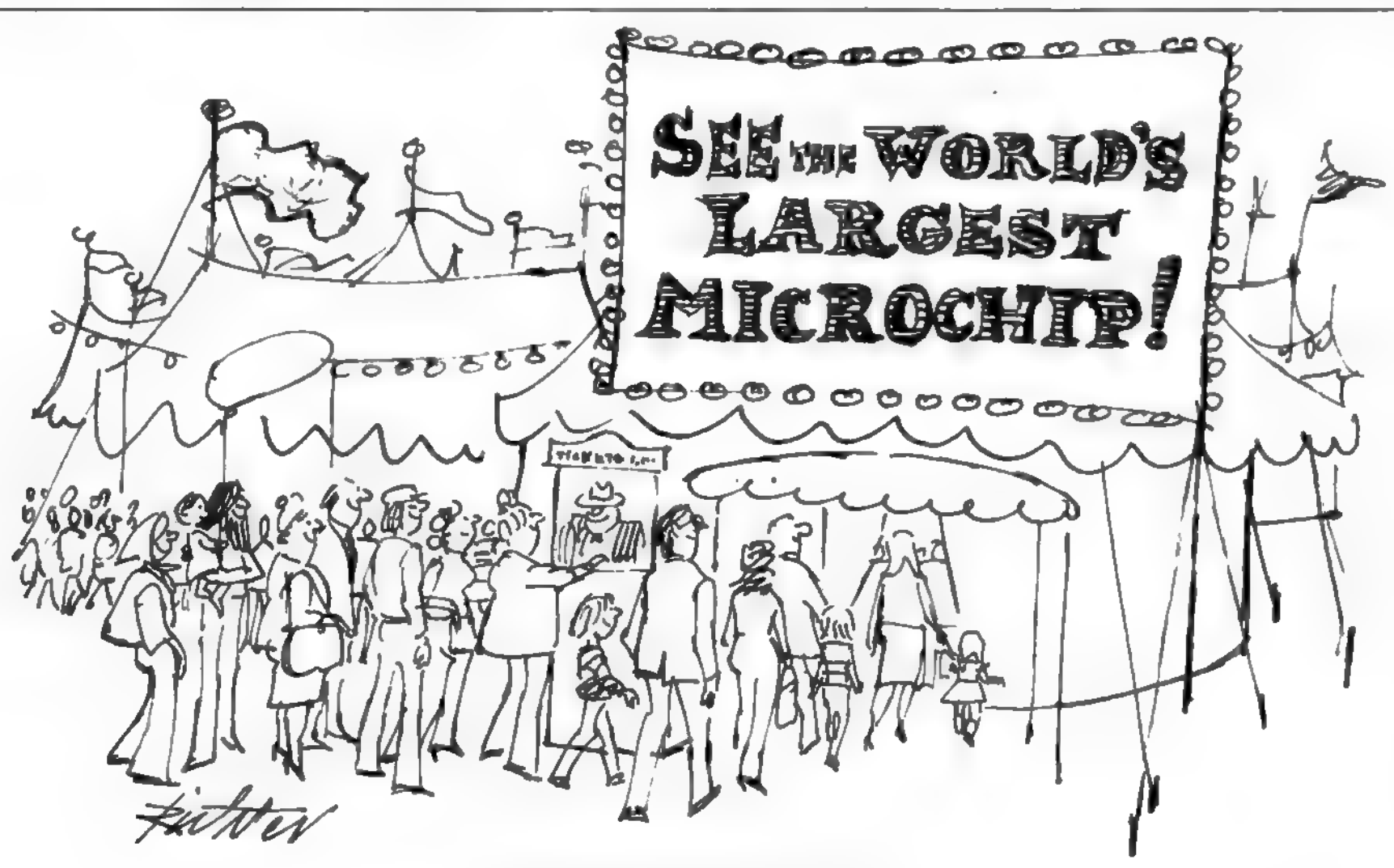
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CIRCLE 416 ON READER SERVICE CARD


```
1690 REM
1700 LOCATE 22
1710 END
1710 REM
```

Turtle Graphics

The Draw command and its associated command language provide capabilities that are similar to but not the same as turtle graphics, part of the computer language called LOGO. LOGO is an exciting new language originally designed to help children understand computers and geometry. It was inspired by Jean Piaget who is renowned for his theories of human development.

In LOGO, you move a graphics cursor called a turtle around the screen. You can move this graphics cursor backward and forward and make it turn in the same way as in IBM GDL. Turtles can also be used to make spirals, just as in IBM.

There are, however, fundamental differences between the IBM GDL and turtle graphics. For example, the commands used to move the turtle are expressed in words, which are an integral part of the LOGO language as opposed to IBM GDL where the Move commands are given by single letters hidden in strings. There are also other important differences. For example, a turtle always has a heading, which is the direction it faces. You can instruct the turtle to go forward or backward by a specified number of steps; but you cannot tell it to go directly to the left or right a certain number of steps. Instead, you must first instruct it to change its heading by a certain number of degrees and then tell it to move forward in that direction. With IBM GDL, you can only go in eight different directions and are limited to turns by multiples of 90 degrees. Turtles can turn in any direction. In view of these limitations, maybe we ought to call the graphics cursor in the IBM GDL, a toad rather than a turtle.

Animation and the Cursor Keys

The next applications example illustrates two extremely important areas of computer graphics: animation and interactive input. As a simple demonstration of how both of these concepts can be handled in the IBM PC, we present a program that manipulates a PacMan-like figure called PC-Person. The cursor keys control the motion of the figure. Hitting the right cursor key moves PC-Person to the right. If you hit the left cursor key once, the motion will stop, and if you hit it again, PC-Person will move to the left. Once the figure moves to the left, hitting the left cursor key again will not have any effect. The same thing happens with any pair of "opposite" keys (up-down or left-right).

IN ANIMATION, it is normal to repeat frames in a given animation sequence or even to repeat cycles many times.

When PC-Person hits the edge of the screen, he "wraps" around to the opposite edge of the screen. You can, however, modify the program to make PC-Person bounce off the walls instead. (Hint: You will have to change lines 700-750.)

```
100 REM PC-PERSON
110 REM
120 REM This program draws a
130 REM Pacman-like object and
140 REM allows you to move it
150 REM around the screen.
160 REM
170    SCREEN 1 : KEY OFF
180 REM
190 REM dim man$(4)
200 REM
210 REM The following strings define
220 REM the man.
230 REM
240 REM The outline of the head
250    H$="h618g6d8f6r8"
260 REM
270 REM The eye
280    E$ ="reh1gf"
290    1E1$="b111bul"+E$+"br1db5"
300    E2$="b110bul"+E$+"b10bd5"
310    E3$="b19bul" +E$+"b11bd5"
320 REM
330 REM The mouths:
340    M1$="e4hhhlhhlhrererererrr"
350    M2$="e6h11h11h11hrrrerrrerruu"
360    M3$="e6u4110r10u4"
370 REM
380 REM Now put them together to get
390 REM the animation sequence
400    MAN$(0)="br10bu4"+H$+M1$+E1$
410    MAN$(1)="br10bu4"+H$+M2$+E2$
420    MAN$(2)="br10bu4"+H$+M3$+E3$
430    MAN$(3)="br10bu4"+H$+M2$+E2$
440    MAN$(4)=MAN$(0)
450 REM
460    CLS
470 REM
480 REM At the start
```

```
490   K = 1          :REM frame number
500   X=160:Y=100    :REM position
510 REM
520   DRAW MAN$(0)
530 REM
540 REM Now move it
550 REM
560 REM define interrupt routines
570   ON KEY(11) GOSUB 870
580   ON KEY(12) GOSUB 920
590   ON KEY(13) GOSUB 970
600   ON KEY(14) GOSUB 1020
610 REM
620 REM enable interrupts
630   KEY(11) ON
640   KEY(12) ON
650   KEY(13) ON
660   KEY(14) ON
670 REM
680 REM Main loop
690 REM
700 REM check bounds
710   X=(X+DELX) MOD 320
720   IF X<0 THEN X=X+320
730 REM
740   Y=(Y+DELY) MOD 200
750   IF Y<0 THEN Y=Y+200
760 REM
770   MOV$="c3bm0,0;br=x;bd=y;"
780 REM
790 REM now draw it
800   DRAW "c0"+MAN$(K-1)+MOV$+MAN$(K)
810 REM
820 REM next frame
830   K= K+1
840   IF K=5 THEN K=1
850   GOTO 680
860 REM
870 REM cursor up
880   DELY=DELY-10
890   IF DELY<-10 THEN DELY=-10
900   RETURN
910 REM
920 REM cursor left
930   DELX=DELX-10
940   IF DELX<-10 THEN DELX=-10
950   RETURN
960 REM
970 REM cursor right
980   DELX=DELX+10
990   IF DELX>+10 THEN DELX=+10
1000    RETURN
1010 REM
1020 REM cursor down
1030   DELY=DELY+10
1040   IF DELY>+10 THEN DELY=+10
1050   RETURN
1060 REM
1070 REM
1080   END
```

When you run this program, the PC-Person appears to be opening and closing his mouth constantly. Notice that the eye also appears to move forward and backward. What is actually happening is a fairly rapid sequence display of views of the same figure in different positions. This sequence of views is called the *animation sequence*. In the sample program, we define three different positions (views) for our PC-Person. In Position 1, the mouth is open fully; in position 2, it is partially closed; and position 3, the mouth is completely closed. The animation sequence consists of a cycle in which positions 1, 2, 3, and 2 are repeated over and over again. Position 2 appears twice each cycle. In animation, it is normal and economical to repeat frames in a given animation sequence or even to repeat cycles many times.

Each view or position of the man consists of several basic pieces. The main outline of the head is the same in all views, as is the basic shape of the eye. The mouth is the only part that is shaped differently. The parts of the face are put together and stored in a string array called MAN$.

```
MAN$(0) has position 1 (mouth
open)
MAN$(1) has position 2 (mouth
partially closed)
MAN$(2) has position 3 (mouth
closed)
MAN$(3) has position 2 (mouth
partially closed)
```

This array corresponds exactly to one cycle of the animation sequence.

The construction of the figure is completed in the first part of the program. The animation sequence is then implemented in the middle of the program in a main loop (lines 650-800) called the animation loop. This is an endless loop that will continue until you hit Break.

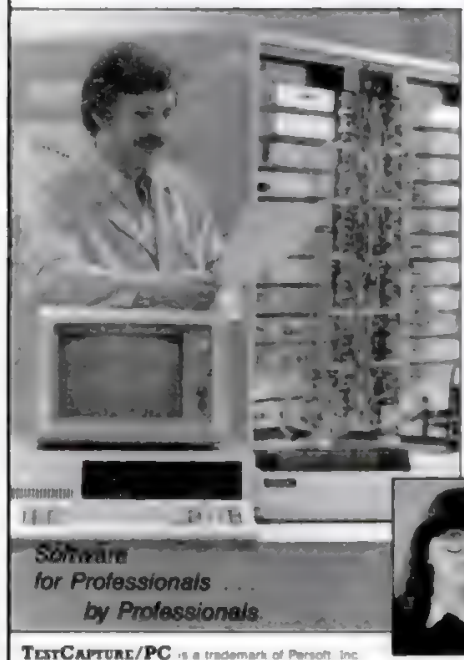
In the animation loop, you begin by entering a string called MOV$. This indicates the new location of the man (line 770). A single Draw command (line 800) then erases the figure by turning the color to 0 and drawing it in both the old position (using index K-1) and the old location; moves to the new location using the MOV$ string; and draws the man in the new position using index K. Following the Draw command, the index is incremented, then adjusted back to zero if it gets too large. The result is that the figure is rapidly erased and redrawn as the index cycles through the values 0, 1, 2 3.

It is important to redraw the figure as soon as possible to cut down on flicker. Even so, you will still see some flicker when you run this program because the Draw command is not quite fast enough for perfect animation.

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Using the Cursor Keys

Now let's turn our attention to the subject of interactive input. The cursor keys provide the IBM PC with built-in interactive input facilities. These keys allow you to move various parts of a picture around, perhaps for an animated game or for the development of a design (room design or design of an electronic circuit).

At first glance, the sample program looks as if there is no input possible during the main loop. Actually, there is no Input statement and no INKEY$ statement, yet when you press any one of the cursor keys, PC-Person starts to move in the indicated direction. How do the cursor keys work? The secret is *interrupts*. When you press one of the cursor keys while this program is running, the program is actually interrupted to process that keystroke.

IBM BASIC is designed to handle interrupts from as many as 14 different keys. These include the function keys (ten keys on the left side of your keyboard) and the cursor keys (the four keys marked with arrows on the right side of your keyboard). The function keys are assigned numbers from 1 to 10 and the cursor keys are assigned numbers from 11 to 14.

Normally, these keys will not interrupt your program, but you must do three things before this will happen successfully: you must *enable* each key that you want to use; you must declare the location (line number) of an interrupt service subroutine for each key; and you must write an interrupt service routine for each key.

IBM BASIC is designed to handle interrupts from as many as 14 different keys.

Normally, interrupts are disabled, meaning that these special keys behave like any other keys. While your program is running, you can use the INPUT or INKEY$ statements to wait for combinations of (or single) keystrokes that involve these or any other keys.

Interrupts are enabled by the Key(n) On command. An interrupt from key number *n* can only occur after the Key(n) On has been executed. In our program, this command occurs in lines 600-630 with one statement for each key that we want to enable. The syntax for this command is:

```
KEY(n) ON  (enable interrupts
from key number n)
```

You can use the Key(n) Off to disable any further interrupts from the key and you can use the Key(n) Stop to stop processing temporarily, but you must remember the interrupts since they will be processed upon execution of a subsequent Key(n) On for that key. The syntax for these two commands is:

```
KEY(n) OFF  (disable inter-
rupts from key number n)
KEY(n)  STOP  (stop  inter-
rupts from key number n)
```

Interrupt service subroutines are declared with the On Key command (not to be confused with the Key(n) On or the Key On command). This command allows you to place your interrupt service routine wherever you want in your BASIC program. The syntax is:

```
ON KEY(n) GOSUB line
```

where *n* is the number of the key and *line* is the line number of the interrupt service routine you have written for that key.

Now let's look at the interrupt service routines themselves. The purpose of these routines is to take care of the keystroke quickly with the least amount of disruption to the main program. When a program is running, BASIC checks for interrupts before executing each BASIC statement. If interrupts are declared (On Key statement), enabled (Key(n) On statement), but not stopped, then whenever that key is hit, the declared interrupt service subroutine is called automatically. It is interesting to note that while an interrupt subroutine is executing, the corresponding interrupt key is stopped automatically. This is equivalent to putting the Key(n) Stop command at the beginning of the subroutine.

An interrupt service routine in IBM PC

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  - * Where Accident Happened
  - * How Accident Happened
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  - * Date of Visit
  - * Diagnosis
  - * Treatment
  - * Charges
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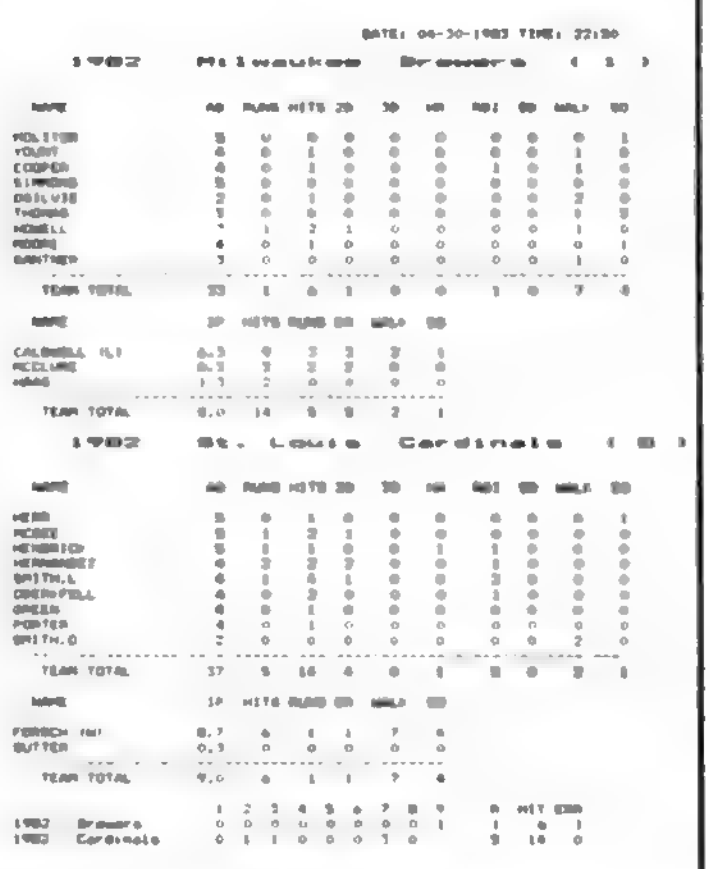
—In addition to printing a box score, the program will update league standings and statistics; you can access the statistics, and print out "League Leaders" for the various statistical categories.

This package is more than just another computer game. It is a complete set of programs which allow you to simulate Major League Baseball in your own home/office. Games, statistics, trades, and more.

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Here is a box score of a Home Computer Major League Baseball Game.



Technical specs: IBM P.C., 64K (160K version now available) minimum, at least one 320K disk drive DOS, BASIC required. Printer supported, not required.

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BASIC looks very much like any other type of BASIC subroutine. For example, it must end with a RETURN statement, which returns control to the main program to the statement following the one where it left off.

The last part of our PC-Person program contains four interrupt subroutines, one for each cursor key. These subroutines are very short—merely updating variables (DELX or DELY). There are certain constants in these routines that you may want to experiment with in order to "tune" the program.

When you run the program, the PC-Person figures are constructed (no interrupts are yet enabled at this point); interrupts are declared (lines 550-580) and enabled (lines 600-630); and the main animation loop is entered. Once you enter the loop, the loop is interrupted whenever you press a cursor key and the appropriate interrupt subroutine is executed, updating the DELX or DELY variable. Each of these variables is used just once in the main loop, and the effect of the key does not become apparent until that point. It is possible for several keystrokes from this key to occur during one complete pass through the animation loop. Since the service subroutines increment or decrement their variables, the effects of these strokes are accumulated, but are displayed only once per pass through the loop.

WHEN A program is running, BASIC checks for interrupts before executing each BASIC statement.

The DELX and DELY actually control the change in position for each complete pass through the loop; that is, they control the velocity of the PC-Person. Every time you hit a key, you "change the change" in position, accelerating or decelerating the figure. We have restricted the values of DELX and DELY so that you can control PC-Person more easily. */PC*

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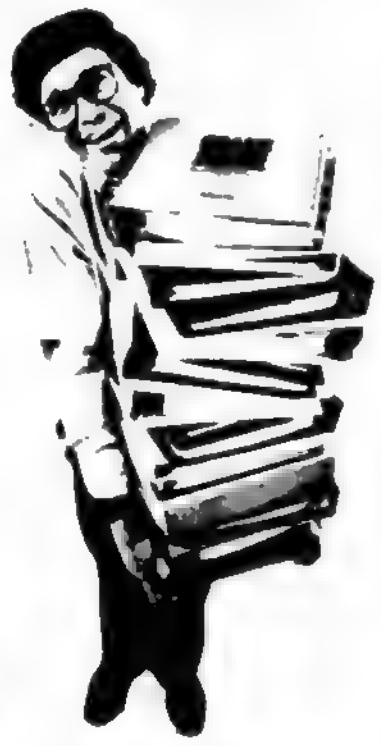
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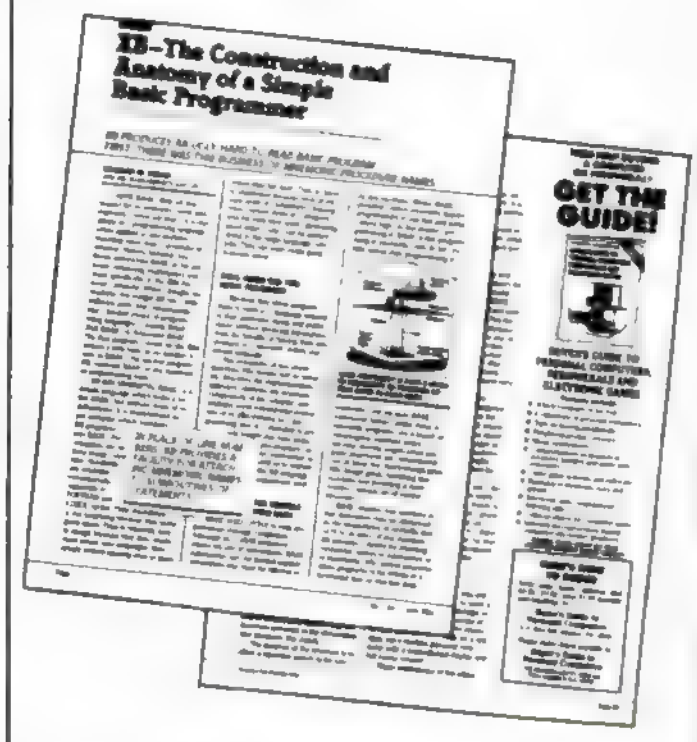
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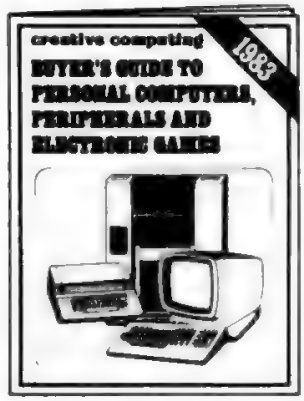
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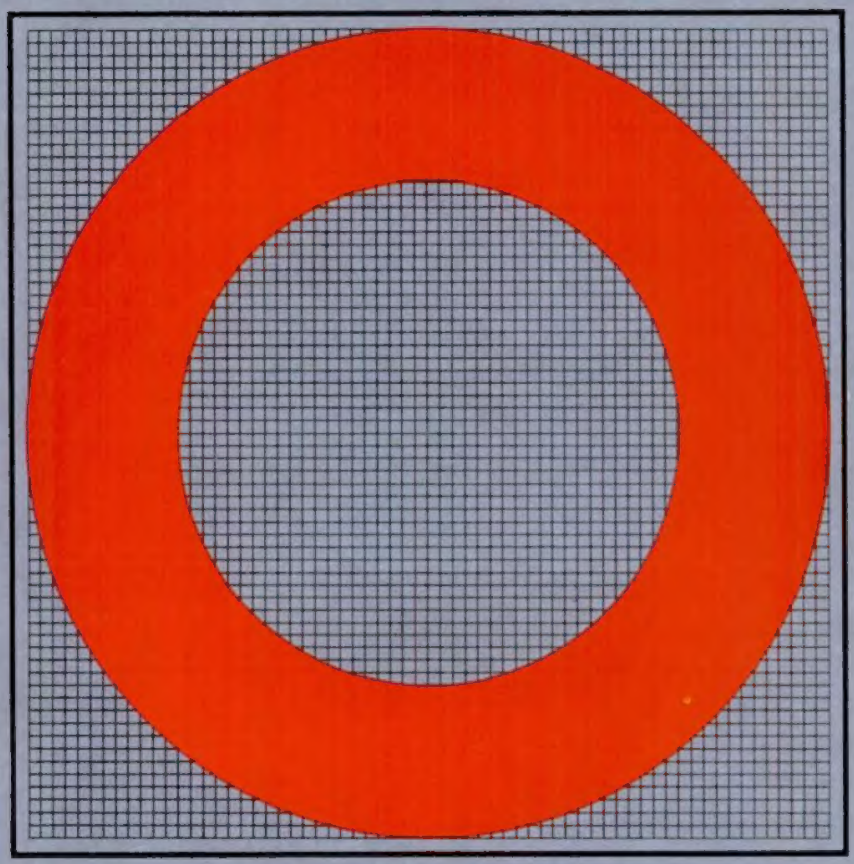
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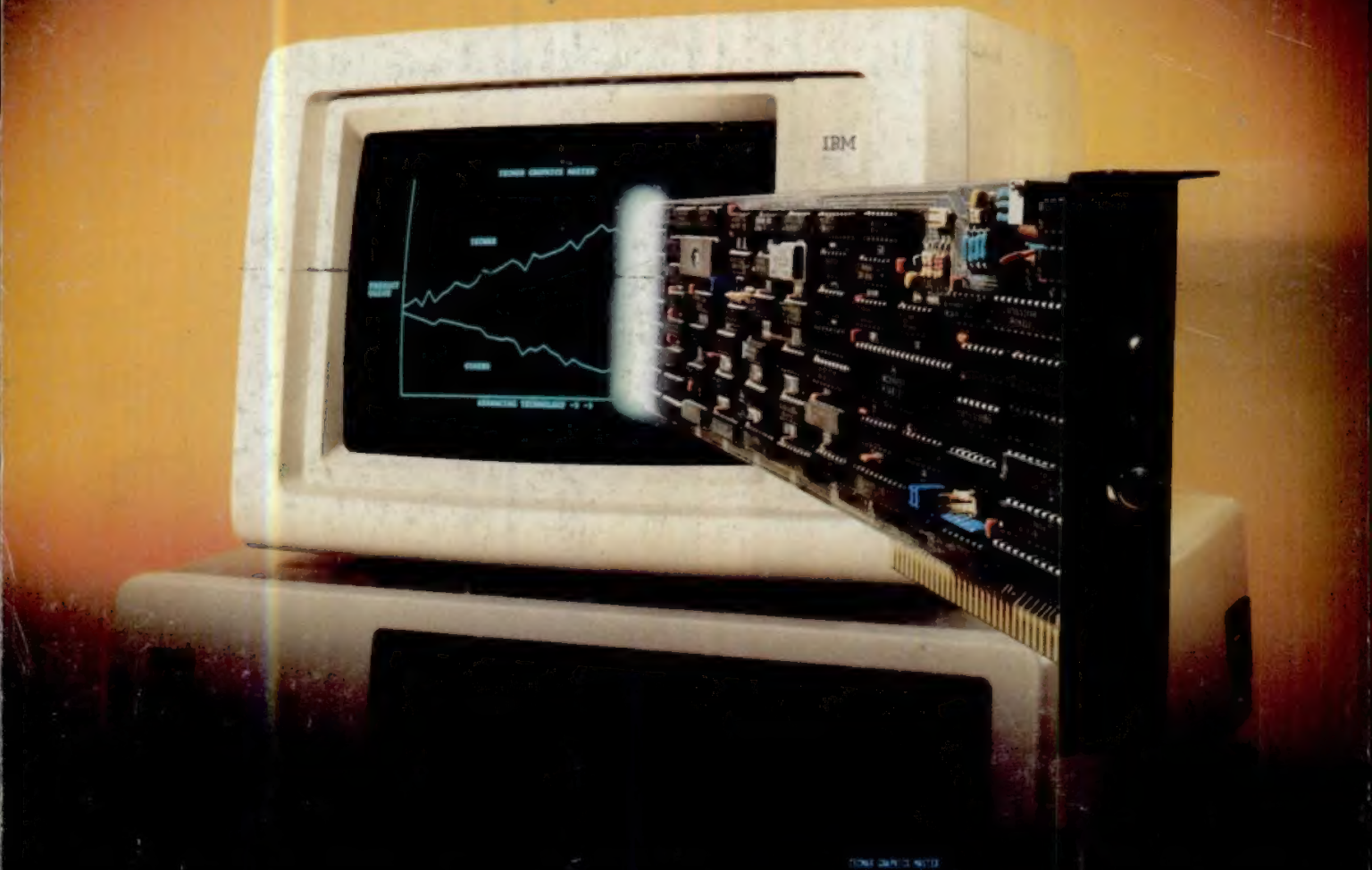
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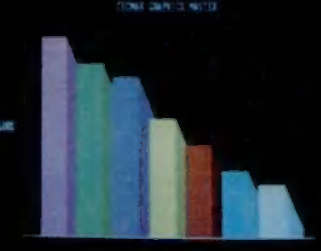


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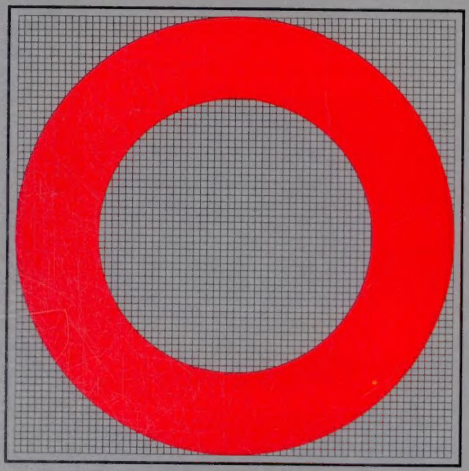
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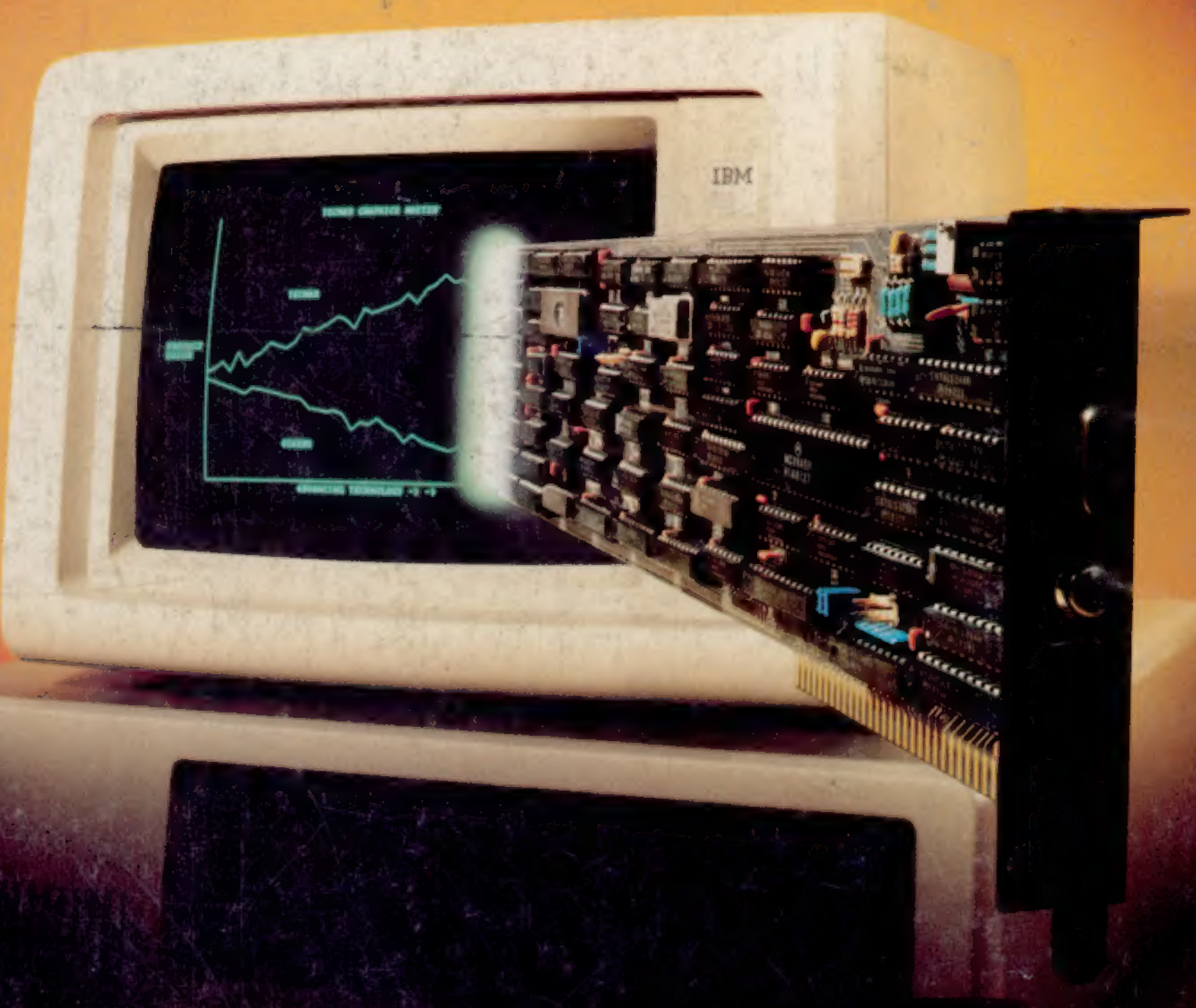
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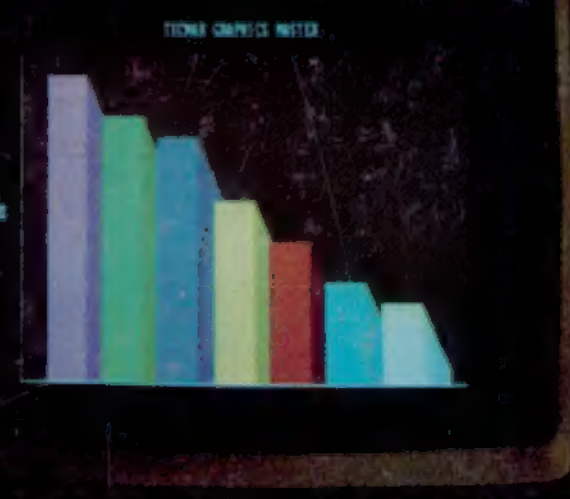


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